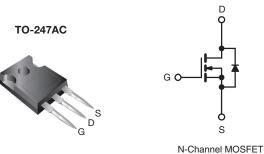




## Power MOSFET

PRODUCT SUMMA	RY		
V <sub>DS</sub> (V)	500		
R <sub>DS(on)</sub> (Ω)	$V_{GS} = 10 V$	0.85	
Q <sub>g</sub> (Max.) (nC)	6	3	
Q <sub>gs</sub> (nC)	1	1	
Q <sub>gd</sub> (nC)	3	0	
Configuration	Sin	gle	



## **FEATURES**

- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- · Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC

## DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-247AC package preferred for is commercial-industrial applications where higher power levels preclude the use of TO-220AB devices. The TO-247AC is similar but superior to the earlier TO-218 package because of its isolated mounting hole. It also provides greater creepage distances between pins to meet the requirements of most safety specifications.

ORDERING INFORMATION	
Package	TO-247AC
Lead (Pb)-free	IRFP440PbF
Lead (FD)-liee	SiHFP440-E3
SnPb	IRFP440
	SiHFP440

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub>	= 25 °C, unl	ess otherwis	se noted)		
PARAMETER	PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V <sub>DS</sub>	500	V
Gate-Source Voltage			V <sub>GS</sub>	± 20	v
Continuous Drain Current	V <sub>GS</sub> at 10 V	$T_{C} = 25 \text{ °C}$ $T_{C} = 100 \text{ °C}$	I.,	8.8	
Continuous Drain Current	VGS at 10 V	T <sub>C</sub> = 100 °C	ID	5.6	A
Pulsed Drain Current <sup>a</sup>			I <sub>DM</sub>	35	
Linear Derating Factor			1.2	W/°C	
Single Pulse Avalanche Energy <sup>b</sup>			E <sub>AS</sub>	480	mJ
Repetitive Avalanche Current <sup>a</sup>			I <sub>AR</sub>	8.8	A
Repetitive Avalanche Energy <sup>a</sup>			E <sub>AR</sub>	15	mJ
Maximum Power Dissipation	T <sub>C</sub> =	25 °C	PD	150	W
Peak Diode Recovery dV/dtc			dV/dt	3.5	V/ns
Operating Junction and Storage Temperature Rang	Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature) for 10 s			300 <sup>d</sup>		
Mounting Torque	6 20 or 1	M3 screw		10	lbf ∙ in
Mounting Torque	0-32 OF 1	VID SCIEW		1.1	N · m

#### Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b.  $V_{DD}$  = 50 V, starting T<sub>J</sub> = 25 °C, L = 11 mH, R<sub>g</sub> = 25  $\Omega$ , I<sub>AS</sub> = 8.8 A (see fig. 12).

c.  $I_{SD} \le 8.8$  A, dI/dt  $\le 100$  A/µs,  $V_{DD} \le V_{DS}$ ,  $T_J \le 150$  °C.

d. 1.6 mm from case.

\* Pb containing terminations are not RoHS compliant, exemptions may apply

Document Number: 91228 S11-0444-Rev. B, 14-Mar-11 www.vishay.com



Vishay Siliconix



Static         V <sub>DS</sub> V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA         500         -         V	THERMAL RESISTANCE RATI	NGS							
Case-to-Sink, Flat, Greased Surface $R_{HCS}$ $0.24$ $ 0.83$ $^{\circ}CW$ SPECIFICATIONS (T <sub>g</sub> = 25 °C, unless otherwise noted)         TEST CONDITIONS         Min.         TYP.         MAX.         UNIT           State         Test conditions         Min.         TYP.         MAX.         UNIT           State         Test conditions         Min.         TYP.         MAX.         UNIT           Organsource Breakdown Votage         Vos         Vos         State         State         No.8         Vos         C.0.2         Vos         Vos         State           Organsource Breakdown Votage         Vos         Vos         State         No.8         Vos         State	PARAMETER	SYMBOL	TYP.		MAX.			UNIT	
Maximum Junction-to-Case (Drain) $R_{h,uc}$ -         0.83           SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)         Far Conditions         Min.         TYP.         MAX.         UNIT           Static         Drain-Source Breakdown Voltage         V <sub>DS</sub> V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 µA         500         -         -         V           Gate-Source Inveshold Voltage         V <sub>DS</sub> Reference to 25 °C, I <sub>D</sub> = 1 mA         -         0.78         -         V/C           Gate-Source Inveshold Voltage         V <sub>DS</sub> (T <sub>J</sub> )         Reference to 25 °C, I <sub>D</sub> = 1 mA         -         0.78         -         V/C           Gate-Source Inveshold Voltage         V <sub>DS</sub> (T <sub>J</sub> )         Reference to 25 °C, I <sub>D</sub> = 1 mA         -         0.78         -         V/C           Gate-Source Inveshold Voltage         V <sub>DS</sub> (T <sub>J</sub> )         Reference to 25 °C, I <sub>D</sub> = 1 mA         -         0.78         -         V/C           Orain-Source Co-State Resistance         V <sub>DS</sub> = 400 V, V <sub>DS</sub> = 0 V         -         -         2.50         µ           Orain-Source Co-State Resistance         Gaus         V <sub>DS</sub> = 50 V, I <sub>D</sub> = 5.3 Å         -         -         0.85         Ω           Output Capacitance         Coss         V <sub>DS</sub> = 10 V         I <sub>D</sub> = 5.0 Å, R_S = 60 V, C         - <td>Maximum Junction-to-Ambient</td> <td>R<sub>thJA</sub></td> <td>-</td> <td></td> <td>40</td> <td></td> <td></td> <td></td> <td></td>	Maximum Junction-to-Ambient	R <sub>thJA</sub>	-		40				
	Case-to-Sink, Flat, Greased Surface	R <sub>thCS</sub>	0.24 -			°C/W			
$\begin{array}{ c c c c c c } \hline PARAMETER SYMBOL SYMBOL TEST CONDITIONS MIN. TYP. MAX. UNIT State State $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$	Maximum Junction-to-Case (Drain)	R <sub>thJC</sub>	-		0.83				
$\begin{array}{ c c c c c c } \hline PARAMETER SYMBOL SYMBOL TEST CONDITIONS MIN. TYP. MAX. UNIT State State $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$									
Static         VDS         VDS         VDS         VDS         State           Drain-Source Breakdown Voltage $\Delta V_{DS} T_{J}$ Reference to 25 C, to = 1 mA         -         0.78         -         V/C           Gate-Source Intreshold Voltage         VDS         VDS         200         -         4.0         V           Cate-Source Leakage         IDSS         VDS         200         -         4.0         V           Zaro Gate Voltage Drain Current         IDSS         VDS         = 500 V, VDS = 0 V         -         -         250         µ           Prain-Source Con-State Resistance         RDS(m)         VDS = 10 V         ID = 5.3 A <sup>D</sup> -         0.85         20           Drain-Source Con-State Resistance         RDS(m)         VDS = 50 V, VDS = 50 V, ID = 5.3 A <sup>D</sup> -         0.85         20           Drain-Source Charge         Qg         VDS = 50 V, VDS = 50 V, ID = 5.3 A <sup>D</sup> -         0.85         20           Input Capacitance         Coss         VDS = 50 V, ID = 5.3 A <sup>D</sup> -         1300         -           Reverse Transfer Capacitance         Coss         If = 1.0 MHz, see fig. 5         -         120         -           Turn-On Delay Time         tdgorin         F	<b>SPECIFICATIONS</b> ( $T_J = 25 \text{ °C}$ , u	Inless otherwi	ise noted)						
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	PARAMETER	SYMBOL	TEST	CONDIT	ONS	MIN.	TYP.	MAX.	UNIT
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Static								
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0$	) V, I <sub>D</sub> = 2	250 µA	500	-	-	V
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	Reference	to 25 °C,	I <sub>D</sub> = 1 mA	-	0.78	-	V/°C
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V$	′ <sub>GS</sub> , I <sub>D</sub> = 2	250 µA	2.0	-	4.0	V
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Gate-Source Leakage	I <sub>GSS</sub>	VG	<sub>iS</sub> = ± 20	V	-	-	± 100	nA
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Zone Cote Veltoge Drein Current	-	V <sub>DS</sub> = 5	00 V, V <sub>G</sub>	<sub>S</sub> = 0 V	-	-	25	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Zero Gate voltage Drain Current	IDSS	V <sub>DS</sub> = 400 V, V	/ <sub>GS</sub> = 0 V	′, T <sub>J</sub> = 125 °C	-	-	250	μA
DynamicInput CapacitanceCissVGS = 0 V, VDS = 25 V, f = 1.0 MHz, see fig. 5-1300-Output CapacitanceCoss $V_{GS} = 0 V,$ VDS = 25 V, f = 1.0 MHz, see fig. 5-1300-Reverse Transfer CapacitanceCrssf = 1.0 MHz, see fig. 5-120-Total Gate ChargeQg Qga $V_{GS} = 10 V$ $I_D = 8.0 A, V_{DS} = 400 V$ see fig. 6 and 13b63Gate-Drain ChargeQgd $V_{GS} = 10 V$ $I_D = 8.0 A, V_{DS} = 400 V$ see fig. 6 and 13b63Turn-On Delay Timet_d(off) $V_{GS} = 10 V$ $V_{GS} = 31 \Omega$ , see fig. 10b14Rise Timetr $V_{CS} = 10 V$ $V_{DS} = 250 V, I_D = 8.0 A,$ $R_g = 9.1 \Omega, R_D = 31 \Omega$ , see fig. 10b-14-Fall Timetr $V_{DS} = 250 V, I_D = 8.0 A,$ $G mm (0.25^{\circ})$ from package and center of die contact-5.0Internal Drain InductanceL_DBetween lead, $6 mm (0.25^{\circ})$ from package and center of die contact-5.0Internal Source InductanceL_SMOSFET symbol shwing the integral reverse $p - n$ junction diode8.8APulsed Diode Characteristics3.52.0VBody Diode Reverse Recovery Timetr,T_J = 25 °C, I_S = 8.8 A, V_{GS} = 0 V^b2.0VBody Diode Reverse Recovery ChargeQrrT_J = 25 °C, I_S = 8.0 A, dI/dt = 100 A/\mu s^b	Drain-Source On-State Resistance	R <sub>DS(on)</sub>	$V_{GS} = 10 V$	I	<sub>D</sub> = 5.3 A <sup>b</sup>	-	-	0.85	Ω
$ \begin{array}{ c c c c c c c } \hline Input Capacitance & C_{iss} & V_{GS} = 0 \ V, & V_{DS} = 25 \ V, & I_{DS} = 25 \ V, & I_{S} = 10 \ MHz, see fig. 5 & I_{C} & 310 & - & P \\ \hline & & 310 & - & P \\ \hline & & 310 & - & P \\ \hline & & 310 & - & P \\ \hline & & 310 & - & P \\ \hline & & 120 & - & I_{C} & I_{$	Forward Transconductance	9 <sub>fs</sub>	$V_{DS} = 50 \text{ V}, I_D = 5.3 \text{ A}^{b}$		5.3	-	-	S	
$ \begin{array}{ c c c c c c } \hline U_{DU} U_{D} Capacitance & C_{oss} & V_{DS} = 25 \ V, & f = 1.0 \ MHz, see fig. 5 & f = 1.0 \ MHz, see fig. 5 & f = 1.0 \ MHz, see fig. 5 & f = 1.0 \ MHz, see fig. 5 & f = 1.0 \ MHz, see fig. 5 & f = 1.0 \ MHz, see fig. 5 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & 63 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & 30 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & 30 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & 30 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & 30 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & 30 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & - & 30 & f = 1.0 \ MHz, see fig. 6 \ and 13^b & - & - & - & - & - & - & - & - & - & $	Dynamic								
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Input Capacitance	C <sub>iss</sub>	$V_{GS} = 0 V,$		-	1300	-		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Output Capacitance	C <sub>oss</sub>	V	<sub>DS</sub> = 25 \	Ι,	-	310	-	pF
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1.0 MHz, see fig. 5		-	120	-		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Total Gate Charge	Qg				-	-	63	nC
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-Source Charge	Q <sub>gs</sub>	V <sub>GS</sub> = 10 V		-	-	-	11	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-Drain Charge	Q <sub>gd</sub>		566	lig. 0 and 15°	-	-	30	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Turn-On Delay Time	t <sub>d(on)</sub>		1		-	14	-	
$\begin{tabular}{ c c c c c c } \hline Turn-Off Delay Time & t_d(off) & R_g = 9.1 \ \Omega, \ R_D = 31 \ \Omega, \ see fig. 10^b & - & 49 & - & \\ \hline R_g = 9.1 \ \Omega, \ R_D = 31 \ \Omega, \ see fig. 10^b & - & 20 & - & \\ \hline - & 20 & - & & \\ \hline - & 20 & - & & \\ \hline - & 5.0 & - & & \\ \hline - & 13 & - & & \\ \hline - & 10 &$	Rise Time		V <sub>DD</sub> = 2	50 V, I <sub>D</sub> =	= 8.0 A,	-	23	-	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Turn-Off Delay Time	t <sub>d(off)</sub>	B <sub>α</sub> = 9.1 Ω. B	n = 31 Ω	. see fig. 10 <sup>b</sup>	-	49	-	ns
Internal Drain InductanceLD6 mm (0.25") from package and center of die contact-5.0-nHInternal Source InductanceLs $A_S$ $A_S$ -13nHDrain-Source Body Diode CharacteristicsContinuous Source-Drain Diode CurrentIsMOSFET symbol showing the integral reverse p - n junction diode8.8APulsed Diode Forward CurrentaIsMOSFET symbol showing the integral reverse p - n junction diode8.8ABody Diode VoltageVsDTJ = 25 °C, Is = 8.8 A, VGS = 0 Vb2.0VBody Diode Reverse Recovery Timetrr TJ = 25 °C, IF = 8.0 A, dI/dt = 100 A/µsb-460970nsBody Diode Reverse Recovery ChargeQrrTJ = 25 °C, IF = 8.0 A, dI/dt = 100 A/µsb-3.57.6µC	Fall Time	t <sub>f</sub>		0	,	-	20	-	
Internal Source InductanceLspackage and center of die contactImage: Contact of the contact of	Internal Drain Inductance	L <sub>D</sub>	-	m		-	5.0	-	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Internal Source Inductance	L <sub>S</sub>		nter of		-	13	-	nH
Continuous source-brain blode currentIsshowing the integral reverse p - n junction diode8.8APulsed Diode Forward CurrentaIsIs $I_{SM}$ $T_J = 25 ^{\circ}C$ , Is = 8.8 A, VGS = 0 Vb35ABody Diode VoltageVSD $T_J = 25 ^{\circ}C$ , Is = 8.8 A, VGS = 0 Vb2.0VBody Diode Reverse Recovery Time $t_{rr}$ $T_J = 25 ^{\circ}C$ , IF = 8.0 A, dI/dt = 100 A/µsb-460970nsBody Diode Reverse Recovery Charge $Q_{rr}$ $Q_{rr}$ -3.57.6µC	Drain-Source Body Diode Characteristic	cs					•		
Pulsed Diode Forward CurrentaI I SMIntegration diodeI P - n junction diode35Body Diode VoltageVSDTJ = 25 °C, IS = 8.8 A, VGS = 0 Vb2.0VBody Diode Reverse Recovery TimetrrTJ = 25 °C, IF = 8.0 A, dI/dt = 100 A/µsb-460970nsBody Diode Reverse Recovery ChargeQrr3.57.6µC	Continuous Source-Drain Diode Current	I <sub>S</sub>	showing the		-	-	8.8	_	
Body Diode Reverse Recovery Time $t_{rr}$ $T_J = 25 \ ^{\circ}C$ , $I_F = 8.0 \ ^{\circ}A$ , $dI/dt = 100 \ ^{\circ}A/\mu s^b$ -460970nsBody Diode Reverse Recovery Charge $Q_{rr}$ $T_J = 25 \ ^{\circ}C$ , $I_F = 8.0 \ ^{\circ}A$ , $dI/dt = 100 \ ^{\circ}A/\mu s^b$ -3.57.6 $\mu C$	Pulsed Diode Forward Current <sup>a</sup>	I <sub>SM</sub>		ode		-	-	35	
Body Diode Reverse Recovery Charge $Q_{rr}$ $T_J = 25 \ ^{\circ}C$ , $I_F = 8.0 \ ^{\circ}A$ , $dl/dt = 100 \ ^{\circ}A/\mu s^b$ -3.57.6 $\mu C$	Body Diode Voltage	V <sub>SD</sub>	T <sub>J</sub> = 25 °C, I	<sub>S</sub> = 8.8 A	, $V_{GS} = 0 V^{b}$	-	-	2.0	V
Body Diode Reverse Recovery Charge Q <sub>rr</sub> - 3.5 7.6 µC	Body Diode Reverse Recovery Time	t <sub>rr</sub>	T, - 25 °C I= -	8084	/dt - 100 A/ueb	-	460	970	ns
Forward Turn-On Time ton Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> and L <sub>D</sub> )	Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	$I_{\rm J} = 23$ C, $I_{\rm F} =$	0.0 A, UI	αι = 100 ΑγμS <sup>5</sup>	-	3.5	7.6	μC
	Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-	on time	is negligible (turn	-on is dor	minated b	y L <sub>S</sub> and	L <sub>D</sub> )

#### Notes

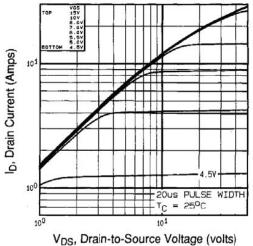
a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. Pulse width  $\leq$  300 µs; duty cycle  $\leq$  2 %.

www.vishay.com 2 Document Number: 91228 S11-0444-Rev. B, 14-Mar-11



**Vishay Siliconix** 



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig. 1 - Typical Output Characteristics, T<sub>C</sub> = 25 °C

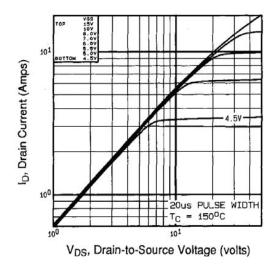


Fig. 2 - Typical Output Characteristics, T<sub>C</sub> = 150 °C

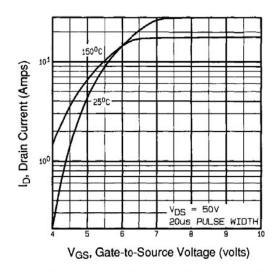


Fig. 3 - Typical Transfer Characteristics

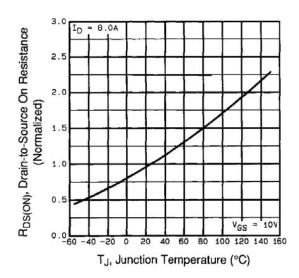


Fig. 4 - Normalized On-Resistance vs. Temperature

Document Number: 91228 S11-0444-Rev. B, 14-Mar-11

www.vishay.com 3

Vishay Siliconix



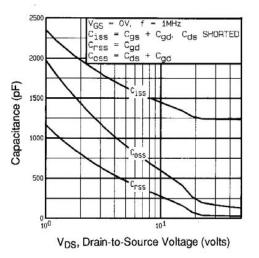


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

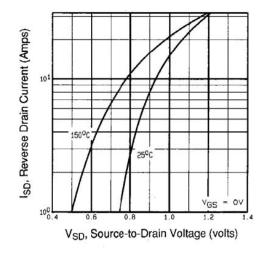


Fig. 7 - Typical Source-Drain Diode Forward Voltage

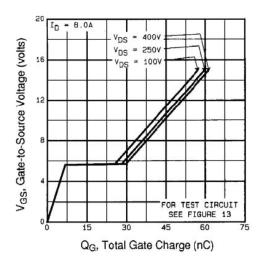


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

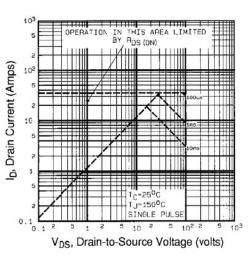


Fig. 8 - Maximum Safe Operating Area

Document Number: 91228 S11-0444-Rev. B, 14-Mar-11



## Vishay Siliconix

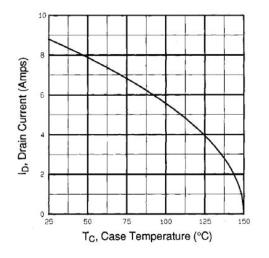


Fig. 9 - Maximum Drain Current vs. Case Temperature

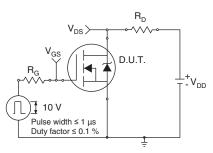


Fig. 10a - Switching Time Test Circuit

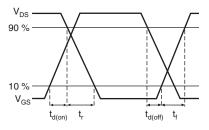


Fig. 10b - Switching Time Waveforms

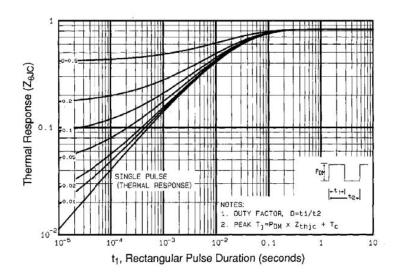


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

## Vishay Siliconix



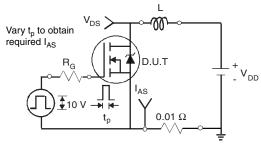


Fig. 12a - Unclamped Inductive Test Circuit

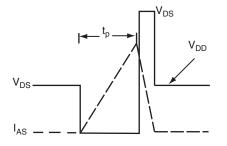


Fig. 12b - Unclamped Inductive Waveforms

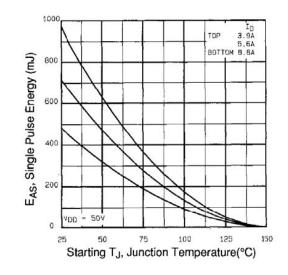


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

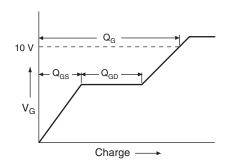
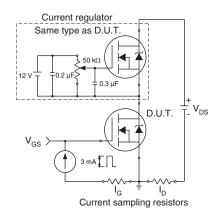


Fig. 13a - Basic Gate Charge Waveform

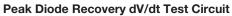


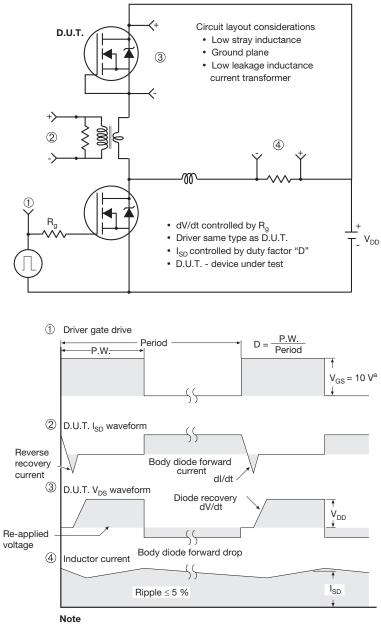


Document Number: 91228 S11-0444-Rev. B, 14-Mar-11









a.  $V_{GS} = 5 V$  for logic level devices

Fig.14 - For N-Channel

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <a href="http://www.vishay.com/ppg?91228">www.vishay.com/ppg?91228</a>.

Document Number: 91228 S11-0444-Rev. B, 14-Mar-11 www.vishay.com



# TO-247AC (High Voltage)

## VERSION 1: FACILITY CODE = 9





Section C--C, D--D, E--E

	MILLIN	IETERS	
DIM.	MIN.	MAX.	NOTES
А	4.83	5.21	
A1	2.29	2.55	
A2	1.50	2.49	
b	1.12	1.33	
b1	1.12	1.28	
b2	1.91	2.39	6
b3	1.91	2.34	
b4	2.87	3.22	6, 8
b5	2.87	3.18	
С	0.55	0.69	6
c1	0.55	0.65	
D	20.40	20.70	4

	MILLIN	IETERS	
DIM.	MIN.	MAX.	NOTES
D1	16.25	16.85	5
D2	0.56	0.76	
E	15.50	15.87	4
E1	13.46	14.16	5
E2	4.52	5.49	3
е	5.44	BSC	
L	14.90	15.40	
L1	3.96	4.16	6
ØP	3.56	3.65	7
Ø P1	7.19	) ref.	
Q	5.31	5.69	
S	5.54	5.74	

### Notes

- <sup>(1)</sup> Package reference: JEDEC<sup>®</sup> TO247, variation AC
- (2) All dimensions are in mm
- <sup>(3)</sup> Slot required, notch may be rounded
- <sup>(4)</sup> Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm per side. These dimensions are measured at the outermost extremes of the plastic body
- <sup>(5)</sup> Thermal pad contour optional with dimensions D1 and E1
- (6) Lead finish uncontrolled in L1
- (7) Ø P to have a maximum draft angle of 1.5° to the top of the part with a maximum hole diameter of 3.91 mm
- (8) Dimension b2 and b4 does not include dambar protrusion. Allowable dambar protrusion shall be 0.1 mm total in excess of b2 and b4 dimension at maximum material condition



## VERSION 2: FACILITY CODE = Y



	MILLIN	IETERS	
DIM.	MIN.	MAX.	NOTES
A	4.58	5.31	
A1	2.21	2.59	
A2	1.17	2.49	
b	0.99	1.40	
b1	0.99	1.35	
b2	1.53	2.39	
b3	1.65	2.37	
b4	2.42	3.43	
b5	2.59	3.38	
С	0.38	0.86	
c1	0.38	0.76	
D	19.71	20.82	
D1	13.08	-	

	MILLIN	IETERS	
DIM.	MIN.	MAX.	NOTES
D2	0.51	1.30	
E	15.29	15.87	
E1	13.72	-	
е	5.46	BSC	
Øk	0.2	254	
L	14.20	16.25	
L1	3.71	4.29	
ØΡ	3.51	3.66	
Ø P1	-	7.39	
Q	5.31	5.69	
R	4.52	5.49	
S	5.51	BSC	

### Notes

- <sup>(1)</sup> Dimensioning and tolerancing per ASME Y14.5M-1994
- <sup>(2)</sup> Contour of slot optional
- (3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- <sup>(4)</sup> Thermal pad contour optional with dimensions D1 and E1
- <sup>(5)</sup> Lead finish uncontrolled in L1
- <sup>(6)</sup> Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- <sup>(7)</sup> Outline conforms to JEDEC outline TO-247 with exception of dimension c



## VERSION 3: FACILITY CODE = N



	MILLIN	IETERS		MILLIN	IETERS
DIM.	MIN.	MAX.	DIM.	MIN.	MAX.
А	4.65	5.31	D2	0.51	1.35
A1	2.21	2.59	E	15.29	15.87
A2	1.17	1.37	E1	13.46	-
b	0.99	1.40	е	5.46	BSC
b1	0.99	1.35	k	0.:	254
b2	1.65	2.39	L	14.20	16.10
b3	1.65	2.34	L1	3.71	4.29
b4	2.59	3.43	N	7.62	BSC
b5	2.59	3.38	Р	3.56	3.66
С	0.38	0.89	P1	-	7.39
c1	0.38	0.84	Q	5.31	5.69
D	19.71	20.70	R	4.52	5.49
D1	13.08	-	S	5.51	BSC

Notes

<sup>(1)</sup> Dimensioning and tolerancing per ASME Y14.5M-1994

<sup>(2)</sup> Contour of slot optional

(3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body

<sup>(4)</sup> Thermal pad contour optional with dimensions D1 and E1

<sup>(5)</sup> Lead finish uncontrolled in L1

<sup>(6)</sup> Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")



Vishay

# Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

# **X-ON Electronics**

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET category:

Click to view products by Vishay manufacturer:

Other Similar products are found below :

614233C 648584F IRFD120 JANTX2N5237 2N7000 FCA20N60\_F109 FDZ595PZ 2SK2545(Q,T) 405094E 423220D TPCC8103,L1Q(CM MIC4420CM-TR VN1206L 614234A 715780A NTNS3166NZT5G SSM6J414TU,LF(T 751625C IPS70R2K0CEAKMA1 BUK954R8-60E DMN3404LQ-7 NTE6400 SQJ402EP-T1-GE3 2SK2614(TE16L1,Q) 2N7002KW-FAI DMN1017UCP3-7 EFC2J004NUZTDG ECH8691-TL-W FCAB21350L1 P85W28HP2F-7071 DMN1053UCP4-7 NTE221 NTE2384 NTE2903 NTE2941 NTE2945 NTE2946 NTE2960 NTE2967 NTE2969 NTE2976 NTE455 NTE6400A NTE2910 NTE2916 NTE2956 NTE2911 TK10A80W,S4X(S SSM6P69NU,LF DMP22D4UFO-7B