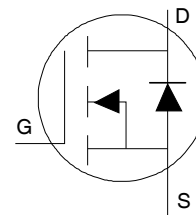


### Applications

- Brushed Motor drive applications
- BLDC Motor drive applications
- Battery powered circuits
- Half-bridge and full-bridge topologies
- Synchronous rectifier applications
- Resonant mode power supplies
- OR-ing and redundant power switches
- DC/DC and AC/DC converters
- DC/AC Inverters

### Benefits

- Improved Gate, Avalanche and Dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche SOA
- Enhanced body diode dV/dt and dI/dt Capability
- Lead-Free
- $V_{DS}(V) = 40V$
- $I_D = 100A$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 2.5m\Omega$  ( $V_{GS} = 10V$ )



### Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	172①	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	122①	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Wire Bond Limited)	120	
$I_{DM}$	Pulsed Drain Current ②	772	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	143	W
	Linear Derating Factor	0.95	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$T_J$	Operating Junction and	-55 to + 175	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10lbf·in (1.1N·m)	
$E_{AS}$ (Thermally limited)	Single Pulse Avalanche Energy ③	161	mJ
$E_{AS}$ (Thermally limited)	Single Pulse Avalanche Energy ④	387	
$I_{AR}$	Avalanche Current ⑤	See Fig. 14, 15, 22a, 22b	A
$E_{AR}$	Repetitive Avalanche Energy ⑥		mJ
$R_{\theta JC}$	Junction-to-Case ⑦		°C/W
$R_{\theta CS}$	Case-to-Sink, Flat Greased Surface	0.50	
$R_{\theta JA}$	Junction-to-Ambient	62	

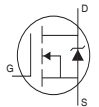
### Static @ T = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	40			V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.035		V/°C	Reference to 25°C, $I_D = 5.0mA$ ②
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		2.0	2.5	mΩ	$V_{GS} = 10V, I_D = 100A$ ③
			3.0		mΩ	$V_{GS} = 6.0V, I_D = 50A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	2.2	3.0	3.9	V	$V_{DS} = V_{GS}, I_D = 100\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current			1.0	μA	$V_{DS} = 40V, V_{GS} = 0V$
				150		$V_{DS} = 40V, V_{GS} = 0V, T_J = 125^\circ C$
$I_{GSS}$	Gate-to-Source Forward Leakage			100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage			-100		$V_{GS} = -20V$
$R_G$	Internal Gate Resistance		2.6		Ω	

#### Notes:

- ① Calculated continuous current based on maximum allowable junction temperature. Bond wire current limit is 120A. Note that current limitations arising from heating of the device leads may occur with some lead mounting arrangements
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ Limited by  $T_{Jmax}$ , starting  $T_J = 25^\circ C$ ,  $L = 0.032mH$ ,  $R_G = 50\Omega$ ,  $I_{AS} = 100A$ ,  $V_{GS} = 10V$ .
- ④  $I_{SD} \leq 100A$ ,  $di/dt \leq 1330A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 175^\circ C$ .
- ⑤ Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ⑥  $C_{oss}$  eff. (TR) is a fixed capacitance that gives the same charging time as  $C_{oss}$  while  $V_{DS}$  is rising from 0 to 80%  $V_{DSS}$ .
- ⑦  $C_{oss}$  eff. (ER) is a fixed capacitance that gives the same energy as  $C_{oss}$  while  $V_{DS}$  is rising from 0 to 80%  $V_{DSS}$ .
- ⑧  $R_\theta$  is measured at  $T_J$  approximately 90°C.
- ⑨ Limited by  $T_{Jmax}$ , starting  $T_J = 25^\circ C$ ,  $L = 1mH$ ,  $R_G = 50\Omega$ ,  $I_{AS} = 28A$ ,  $V_{GS} = 10V$ .

### Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$g_{fs}$	Forward Transconductance	88			S	$V_{DS} = 10\text{V}$ , $I_D = 100\text{A}$
$Q_g$	Total Gate Charge		90	135	nC	$I_D = 100\text{A}$ $V_{DS} = 20\text{V}$ $V_{GS} = 10\text{V}$ ⑤
$Q_{gs}$	Gate-to-Source Charge		23			
$Q_{gd}$	Gate-to-Drain ("Miller") Charge		32			
$Q_{sync}$	Total Gate Charge Sync. ( $Q_g - Q_{gd}$ )		58			
$t_{d(on)}$	Turn-On Delay Time		24		ns	$V_{DD} = 20\text{V}$ $I_D = 30\text{A}$ $R_G = 2.7\Omega$ $V_{GS} = 10\text{V}$ ⑤
$t_r$	Rise Time		68			
$t_{d(off)}$	Turn-Off Delay Time		115			
$t_f$	Fall Time		68			
$C_{iss}$	Input Capacitance		4730		pF	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1.0\text{ MHz}$ $V_{GS} = 0\text{V}$ , $V_{DS} = 0\text{V to } 32\text{V}$ ⑦ $V_{GS} = 0\text{V}$ , $V_{DS} = 0\text{V to } 32\text{V}$ ⑧
$C_{oss}$	Output Capacitance		680			
$C_{rss}$	Reverse Transfer Capacitance		460			
$C_{oss}$ eff. (ER)	Effective Output Capacitance (Energy Related)		845			
$C_{oss}$ eff. (TR)	Effective Output Capacitance (Time Related)		980			
$I_S$	Continuous Source Current (Body Diode)			172	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ⑨			772	A	
$V_{SD}$	Diode Forward Voltage		0.9	1.3	V	$T_J = 25^\circ\text{C}$ , $I_S = 100\text{A}$ , $V_{GS} = 0\text{V}$ ⑩
$dv/dt$	Peak Diode Recovery ⑪		6.8		V/ns	$T_J = 175^\circ\text{C}$ , $I_S = 100\text{A}$ , $V_{DS} = 40\text{V}$
$t_{rr}$	Reverse Recovery Time		24		ns	$T_I = 25^\circ\text{C}$ $V_R = 34\text{V}$ , $T_J = 125^\circ\text{C}$ $I_F = 100\text{A}$
			28			
$Q_{rr}$	Reverse Recovery Charge		17		nC	$T_I = 25^\circ\text{C}$ $di/dt = 100\text{A}/\mu\text{s}$ ⑫ $T_J = 125^\circ\text{C}$
			20			
$I_{RRM}$	Reverse Recovery Current		1.3		A	$T_J = 25^\circ\text{C}$

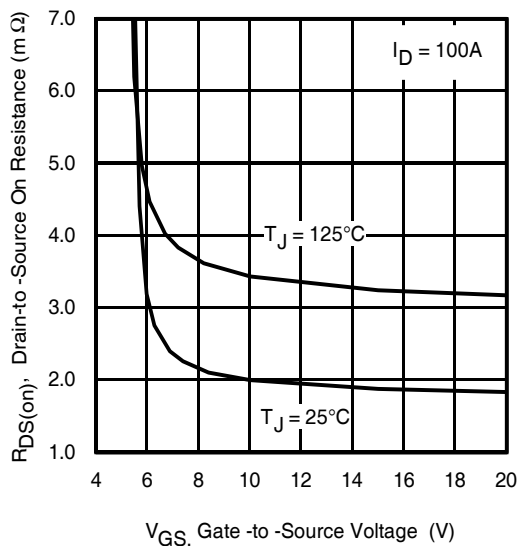


Fig 1. Typical On-Resistance vs. Gate Voltage

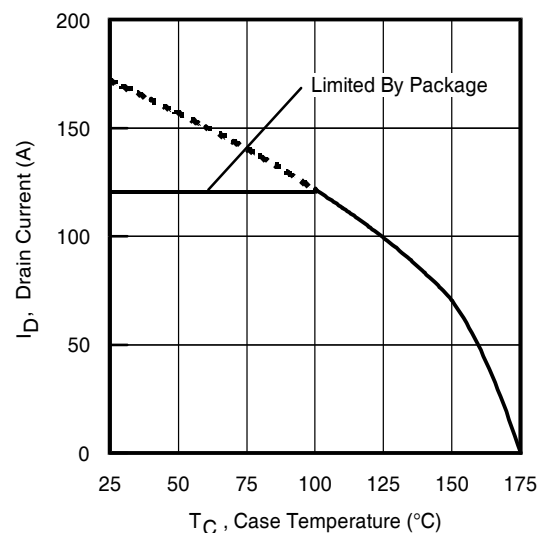


Fig 2. Maximum Drain Current vs. Case Temperature

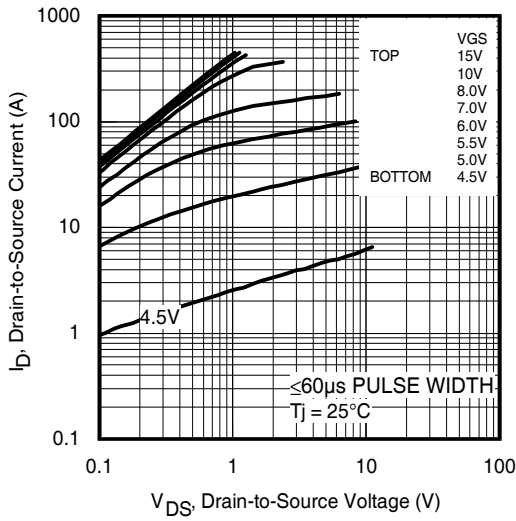


Fig 3. Typical Output Characteristics

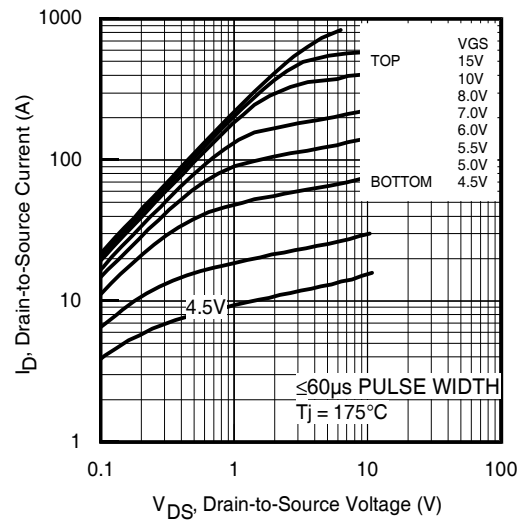


Fig 4. Typical Output Characteristics

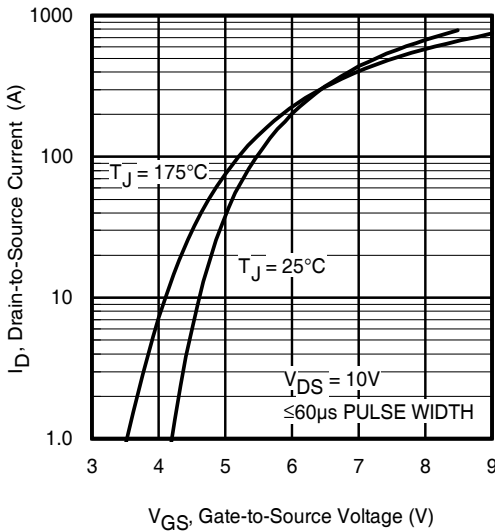


Fig 5. Typical Transfer Characteristics

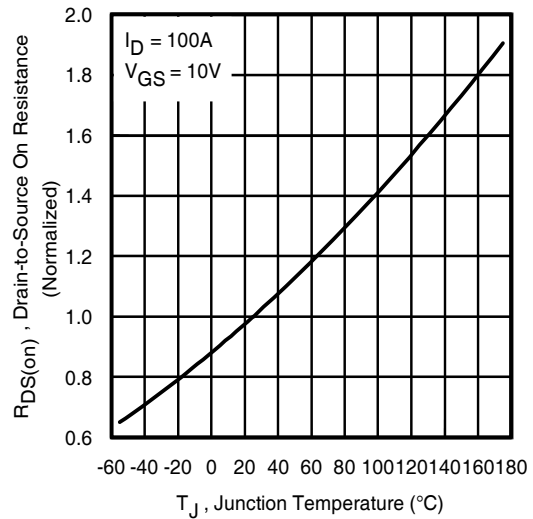


Fig 6. Normalized On-Resistance vs. Temperature

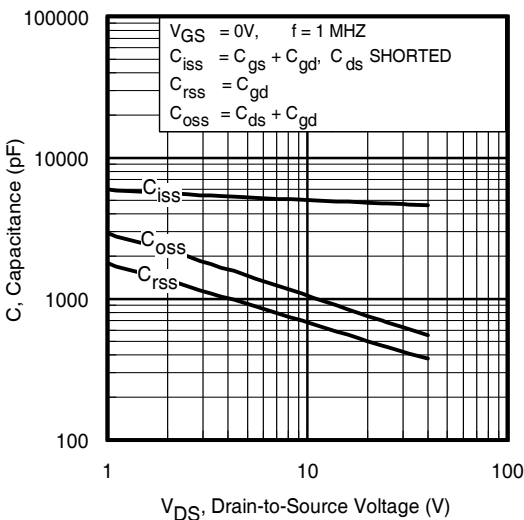


Fig 7. Typical Capacitance vs. Drain-to-Source Voltage

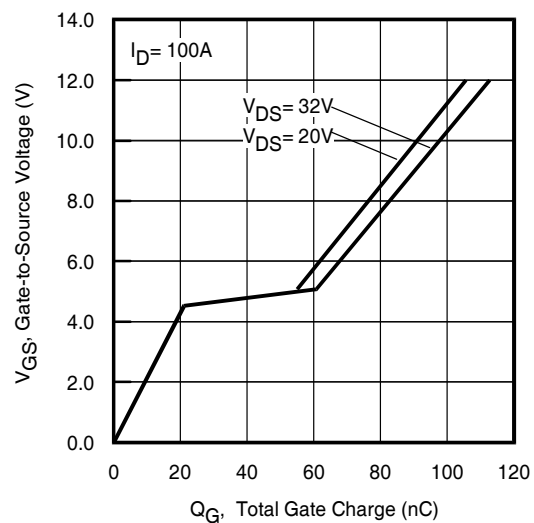


Fig 8. Typical Gate Charge vs. Gate-to-Source Voltage

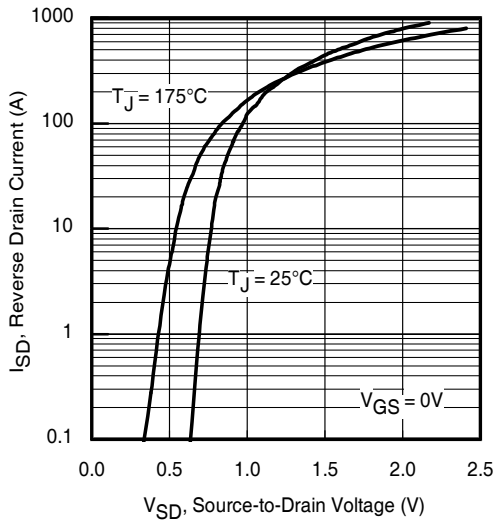


Fig 9. Typical Source-Drain Diode Forward Voltage

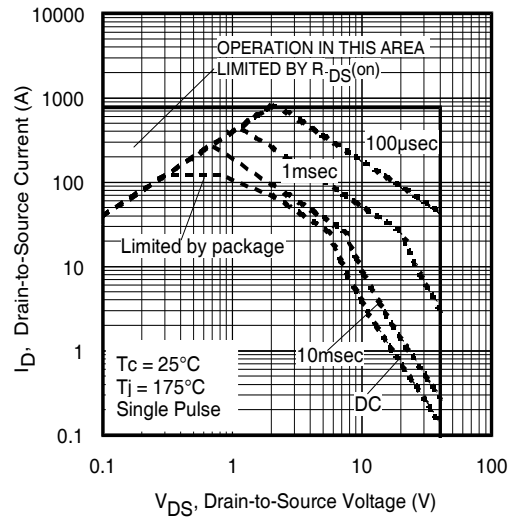


Fig 10. Maximum Safe Operating Area

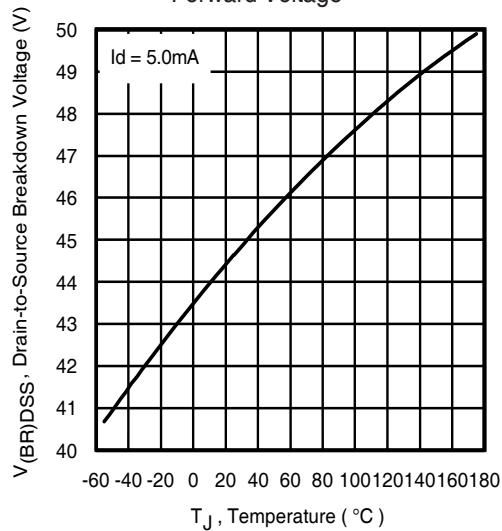


Fig 11. Drain-to-Source Breakdown Voltage

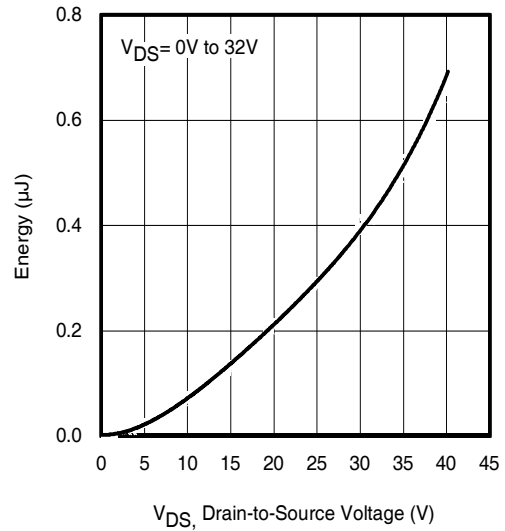


Fig 12. Typical  $C_{OSS}$  Stored Energy

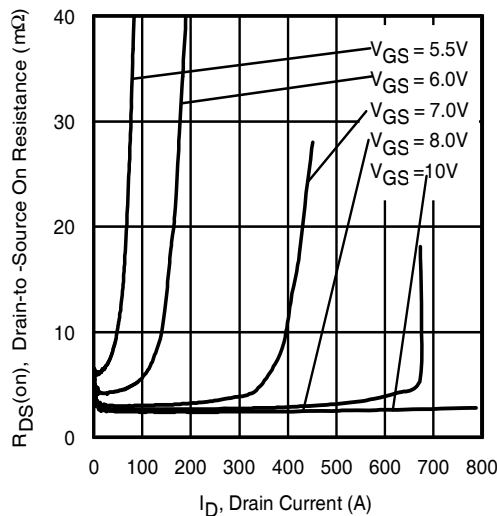


Fig 13. Typical On-Resistance vs. Drain Current

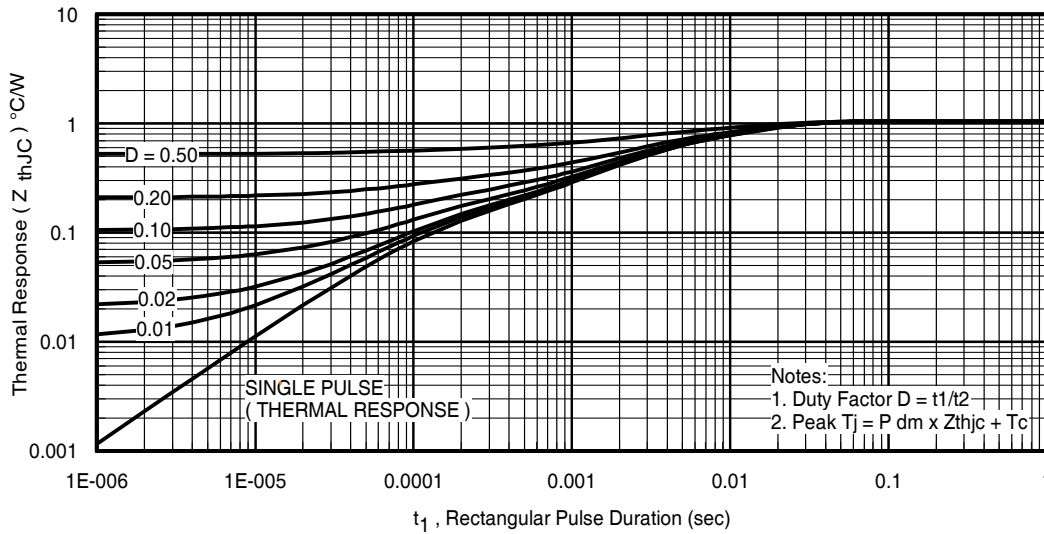


Fig 14. Maximum Effective Transient Thermal Impedance, Junction-to-Case

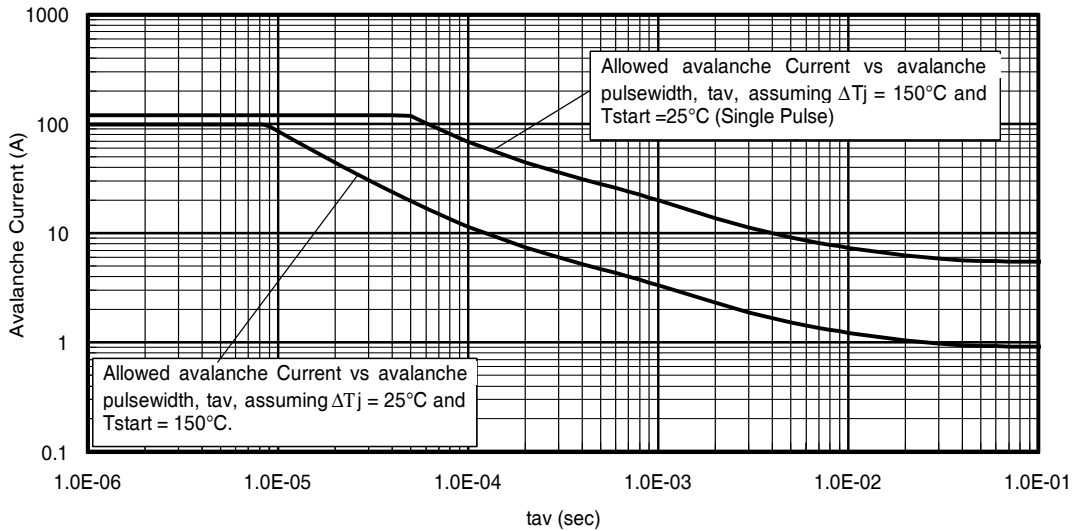


Fig 15. Typical Avalanche Current vs. Pulsewidth

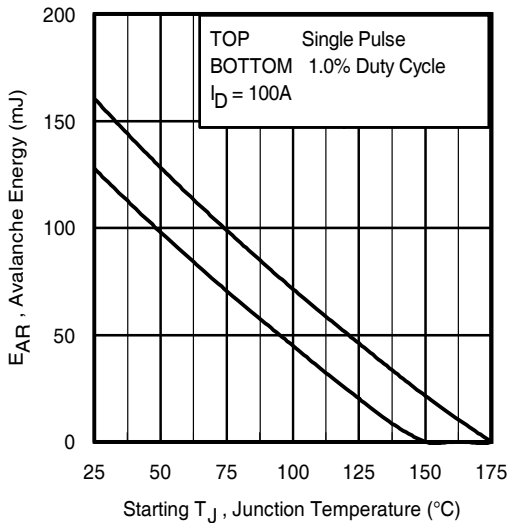


Fig 16. Maximum Avalanche Energy vs. Temperature

Notes on Repetitive Avalanche Curves, Figures 14, 15:

1. Avalanche failures assumption: Purely a thermal phenomenon and failure occurs at a temperature far in excess of  $T_{jmax}$ . This is validated for every part type.
2. Safe operation in Avalanche is allowed as long as  $T_{jmax}$  is not exceeded.
3. Equation below based on circuit and waveforms shown in Figures 16a, 16b.
4.  $P_{D(ave)}$  = Average power dissipation per single avalanche pulse.
5. BV = Rated breakdown voltage (1.3 factor accounts for voltage increase during avalanche).
6.  $I_{av}$  = Allowable avalanche current.
7.  $\Delta T$  = Allowable rise in junction temperature, not to exceed  $T_{jmax}$  (assumed as 25°C in Figure 14, 15).  
 $t_{av}$  = Average time in avalanche.  
 $D$  = Duty cycle in avalanche =  $t_{av} \cdot f$   
 $Z_{thJC}(D, t_{av})$  = Transient thermal resistance)

$$P_{D(ave)} = 1/2 (1.3 \cdot BV \cdot I_{av}) = \Delta T / Z_{thJC}$$

$$I_{av} = 2\Delta T / [1.3 \cdot BV \cdot Z_{th}]$$

$$E_{AS(AR)} = P_{D(ave)} \cdot t_{av}$$

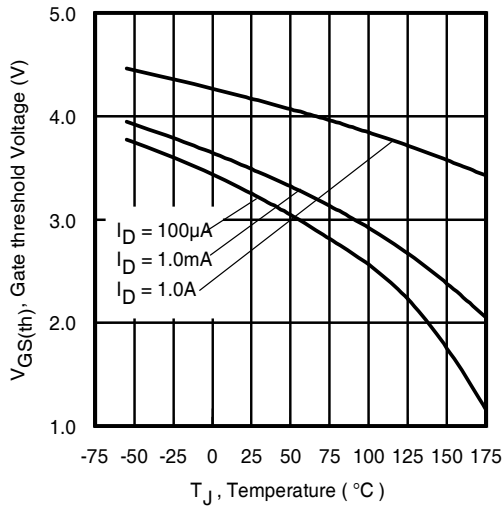


Fig 17. Threshold Voltage vs. Temperature

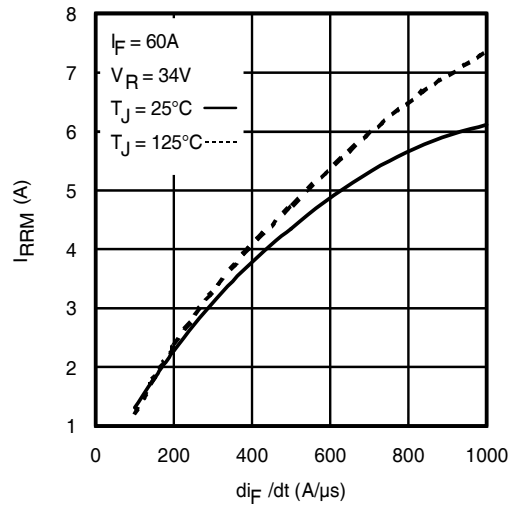


Fig 18. - Typical Recovery Current vs.  $di_F/dt$

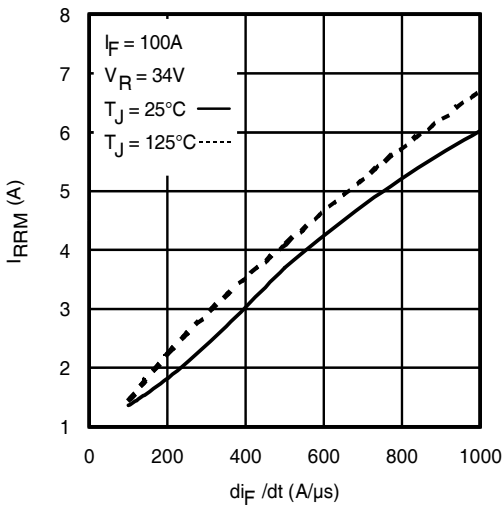


Fig 19. - Typical Recovery Current vs.  $di_F/dt$

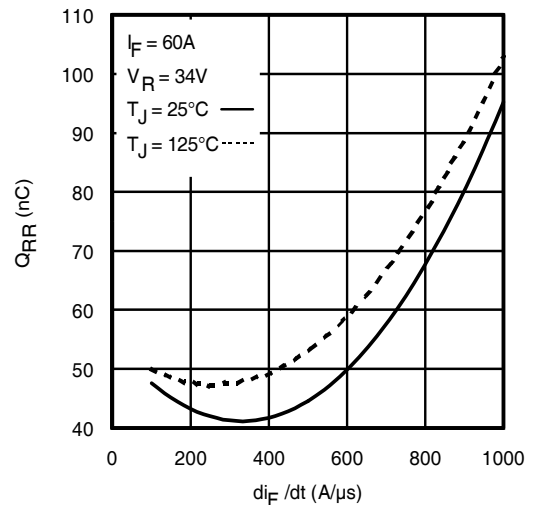


Fig 20. - Typical Stored Charge vs.  $di_F/dt$

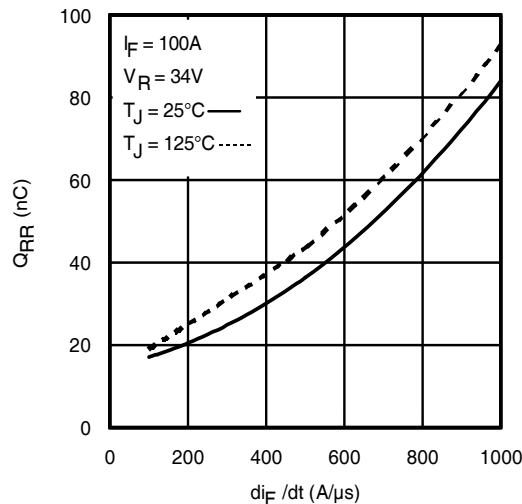
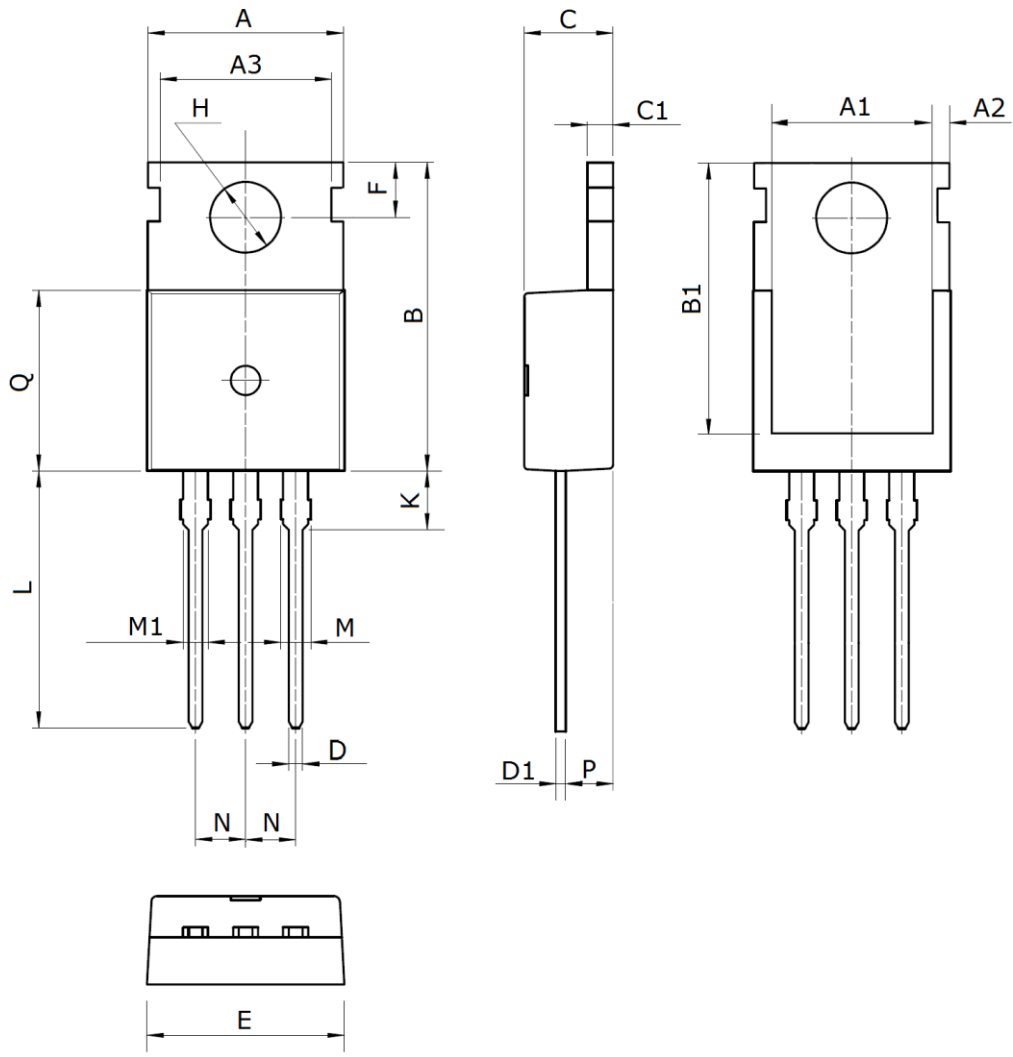


Fig 21. - Typical Stored Charge vs.  $di_F/dt$

Package Dimensions

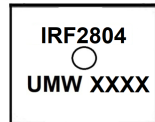
TO 220



Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	10.0±0.3	C1	1.3±0.2	L	13.2±0.4
A1	8.0±0.2	D	0.8±0.2	M	1.38±0.1
A2	0.94±0.1	D1	0.5±0.1	M1	1.28±0.1
A3	8.7±0.1	E	10.0±0.3	N	2.54(typ)
B	15.6±0.4	F	<b>2.8±0.1</b>	P	2.4±0.3
B1	<b>13.2±0.2</b>	H	3.6±0.1	Q	<b>9.15±0.25</b>
C	<b>4.5±0.2</b>	K	3.1±0.2		



**Marking**



**Ordering information**

Order code	Package	Baseqty	Deliverymode
UMW IRFB7440PBF	TO-220	1000	Tube and box

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [MOSFET](#) category:*

*Click to view products by [Youtai](#) manufacturer:*

Other Similar products are found below :

[IRFD120](#) [JANTX2N5237](#) [2SK2267\(Q\)](#) [BUK455-60A/B](#) [TK100A10N1,S4X\(S](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#)  
[IRS2092STRPBF-EL](#) [IPS70R2K0CEAKMA1](#) [TK31J60W5,S1VQ\(O](#) [TK31J60W,S1VQ\(O](#) [TK16J60W,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#)  
[DMN1017UCP3-7](#) [EFC2J004NUZTDG](#) [P85W28HP2F-7071](#) [DMN1053UCP4-7](#) [NTE2384](#) [DMC2700UDMQ-7](#) [DMN2080UCB4-7](#)  
[DMN61D9UWQ-13](#) [US6M2GTR](#) [DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [IPS60R3K4CEAKMA1](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#)  
[STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [IPS60R360PFD7SAKMA1](#)  
[DMN2990UFB-7B](#) [SSM3K35CT,L3F](#) [IPLK60R1K0PFD7ATMA1](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPWS65R035CFD7AXKSA1](#)  
[MCQ7328-TP](#) [SSM3J143TU,LXHF](#) [DMN12M3UCA6-7](#) [PJMF280N65E1\\_T0\\_00201](#) [PJMF380N65E1\\_T0\\_00201](#)  
[PJMF280N60E1\\_T0\\_00201](#) [PJMF600N65E1\\_T0\\_00201](#) [PJMF900N65E1\\_T0\\_00201](#)