

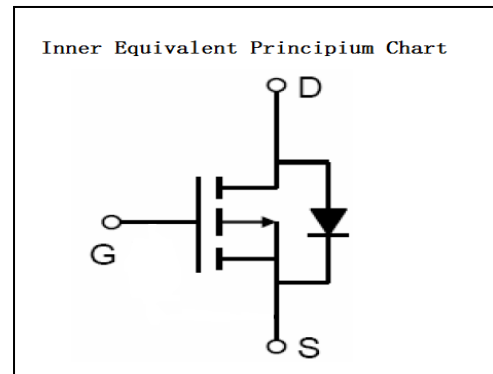
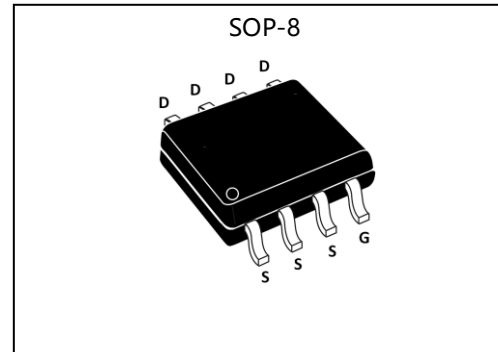
**Feature**

- $R_{DS(ON)} < 15m\Omega$  @  $V_{GS}=10V$  (Typ11m $\Omega$ )
- High density cell design for ultra low  $R_{dson}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

$V_{DSS}$	-40	V
$I_D$	-13	A
$P_D$	3.0	W
$R_{DS(ON)type}$	11	m $\Omega$

**Applications**

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



**Absolute** ( $T_c = 25^\circ C$  unless otherwise specified):

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	-40	V
$I_D$	Continuous Drain Current	-13	A
	Continuous Drain Current $T_c = 70^\circ C$	-10	A
$I_{DM}^{a1}$	Pulsed Drain Current	-50	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{as}^{a5}$	$L=0.5mH$	130	mJ
$dv/dt^{a3}$	Peak Diode Recovery $dv/dt$	5.0	V/ns
$P_D$	Power Dissipation	3.0	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ C$
$T_L$	Maximum Temperature for Soldering	300	$^\circ C$

**Electrical Characteristics** (Tc= 25°C unless otherwise specified)

<b>OFF Characteristics</b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	-40	--	--	V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V, T <sub>a</sub> =25°C	--	--	1.0	μA
I <sub>GSS(F)</sub>	Gate to Source Forward Leakage	V <sub>GS</sub> =+20V	--	--	0.1	μA
I <sub>GSS(R)</sub>	Gate to Source Reverse Leakage	V <sub>GS</sub> =-20V	--	--	-0.1	μA

<b>ON Characteristics<sup>a3</sup></b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R <sub>DS(ON)</sub>	Drain-to-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-14A	--	11	15	mΩ
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	-1	--	-3.0	V

Pulse width  $t_p \leq 380\mu s, \delta \leq 2\%$

<b>Dynamic Characteristics<sup>a4</sup></b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-15V, I <sub>D</sub> =-12A	25	--	--	S
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-20V f=1.0MHz	--	2900	--	pF
C <sub>oss</sub>	Output Capacitance		--	350	--	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	300	--	

<b>Resistive Switching Characteristics<sup>a4</sup></b>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =-20V, I <sub>D</sub> =-12A V <sub>GS</sub> =-10V, R <sub>G</sub> =3Ω	--	10	--	ns
t <sub>r</sub>	Rise Time		--	17	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	36	--	
t <sub>f</sub>	Fall Time		--	38	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =-20V, I <sub>D</sub> =-12A V <sub>GS</sub> =-10V	--	65	--	nC
Q <sub>gs</sub>	Gate to Source Charge		--	14	--	
Q <sub>gd</sub>	Gate to Drain ( "Miller" )Charge		--	27	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$I_S$	Continuous Source Current <sup>a2</sup> (Body Diode)		--	--	-13	A
$V_{SD}$	Diode Forward Voltage <sup>a3</sup>	$I_S = -13A, V_{GS} = 0V$	--	--	-1.5	V
$t_{rr}$	Reverse Recovery Time	$I_S = -13A, T_j = 25^\circ C$	--	35	--	ns
$Q_{rr}$	Reverse Recovery Charge	$di_F/dt = 100A/\mu s, V_{GS} = 0V$	--	30	--	nC

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case <sup>a2</sup>	41.7	$^\circ C/W$

<sup>a1</sup>: Repetitive Rating: Pulse width limited by maximum junction temperature.

<sup>a2</sup>: Surface Mounted on FR4 Board,  $t \leq 10sec$ .

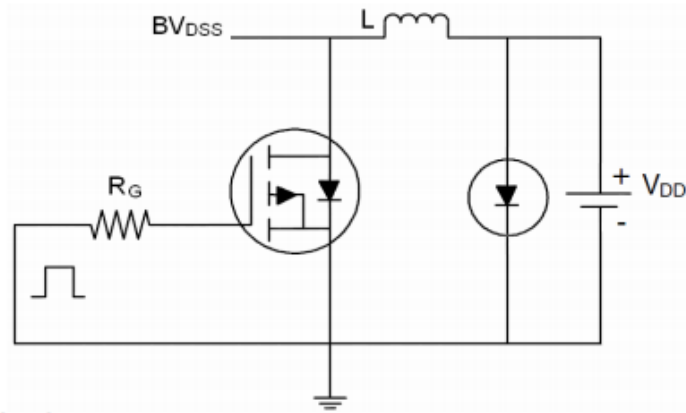
<sup>a3</sup>: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

<sup>a4</sup>: Guaranteed by design, not subject to production

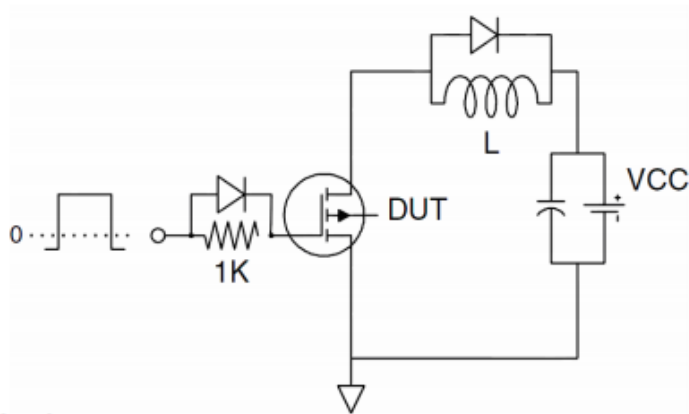
<sup>a5</sup>:  $T_j = 25^\circ C, V_{DD} = -15V, V_G = -10V, L = 0.5Mh$

Test Circuit

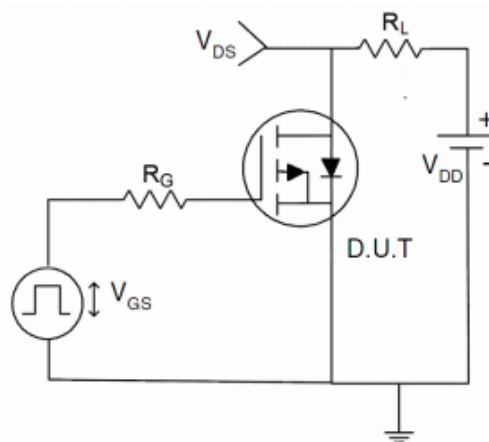
1)  $E_{AS}$  Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Characteristics Curve

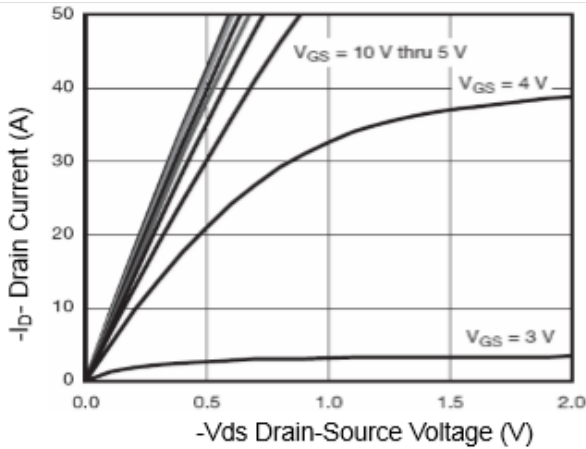


Figure 1 Output Characteristics

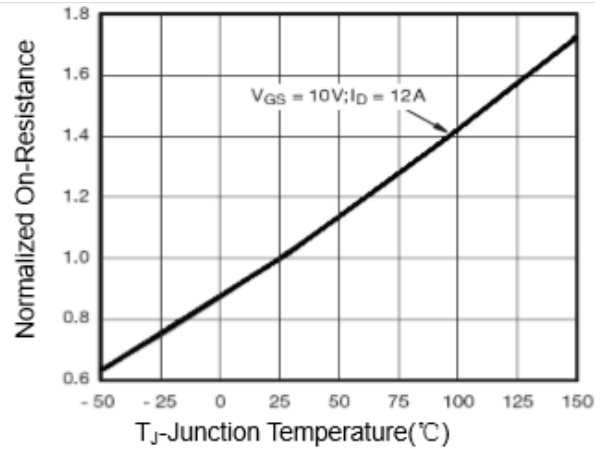


Figure 4 Rdson-Junction Temperature

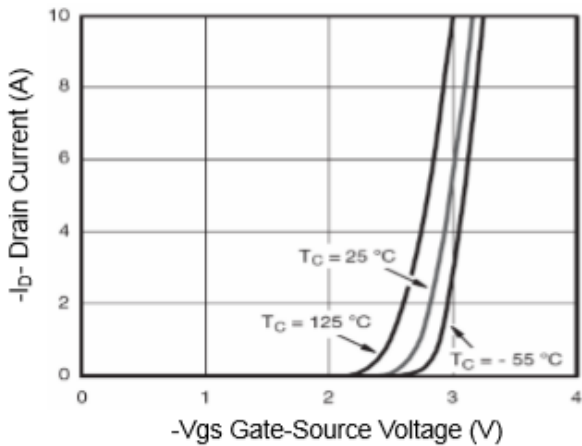


Figure 2 Transfer Characteristics

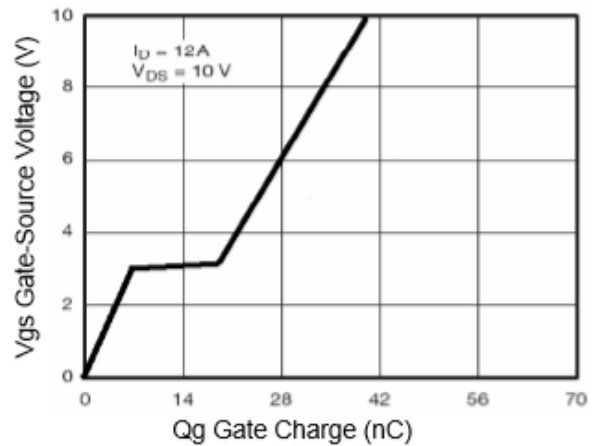


Figure 5 Gate Charge

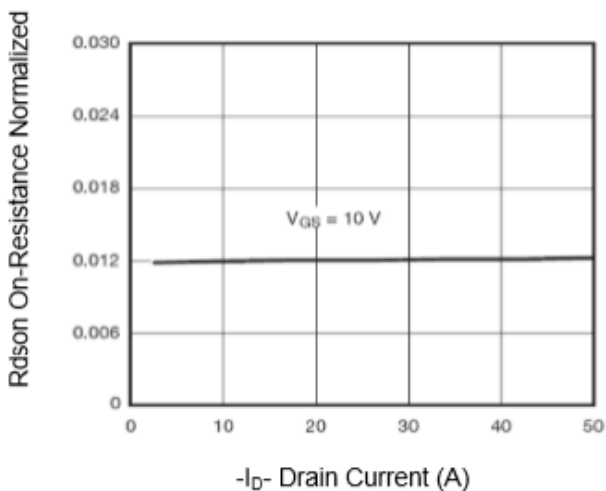


Figure 3 Rdson- Drain Current

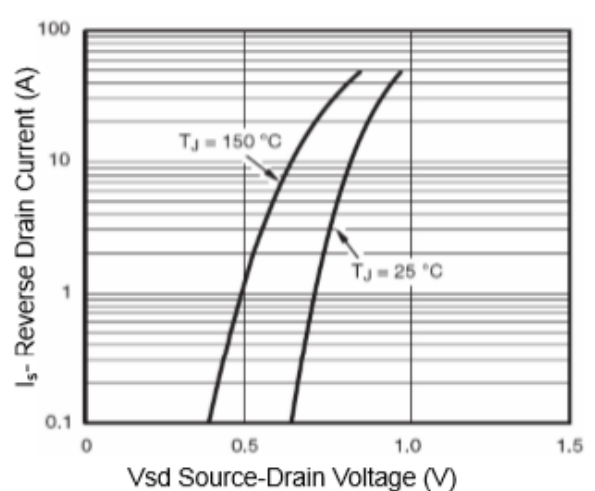


Figure 6 Source- Drain Diode Forward

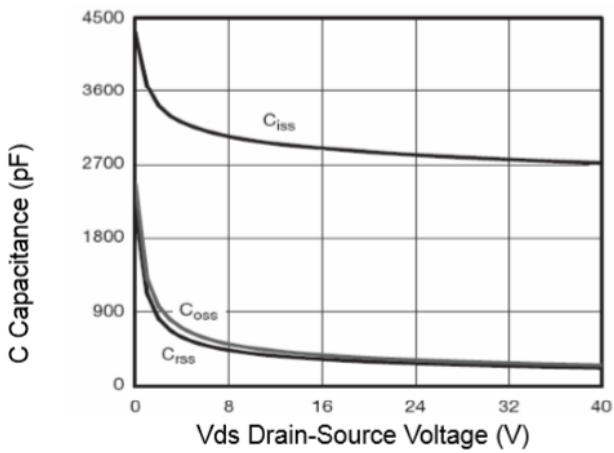


Figure 7 Capacitance vs Vds

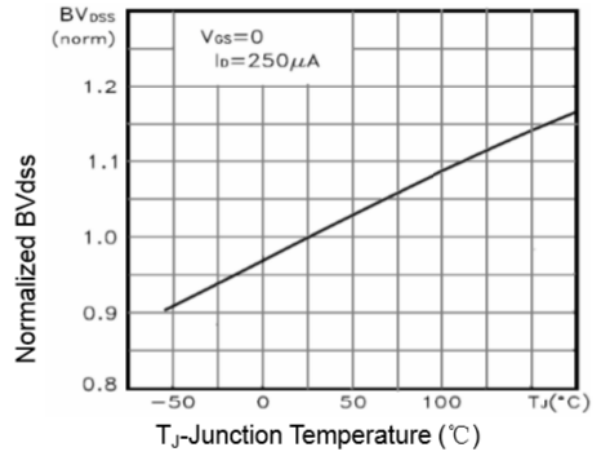


Figure 9 BV<sub>DSS</sub> vs Junction Temperature

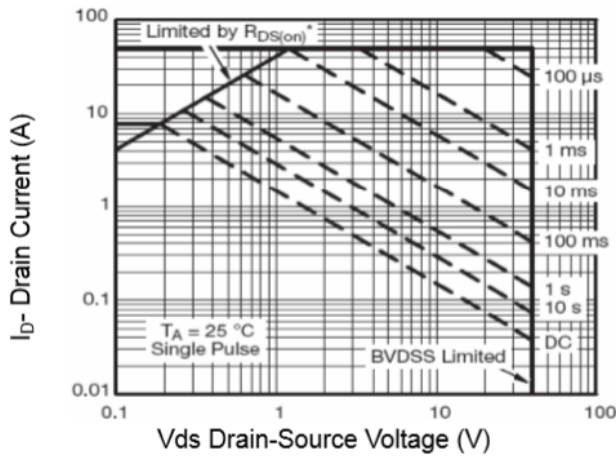


Figure 8 Safe Operation Area

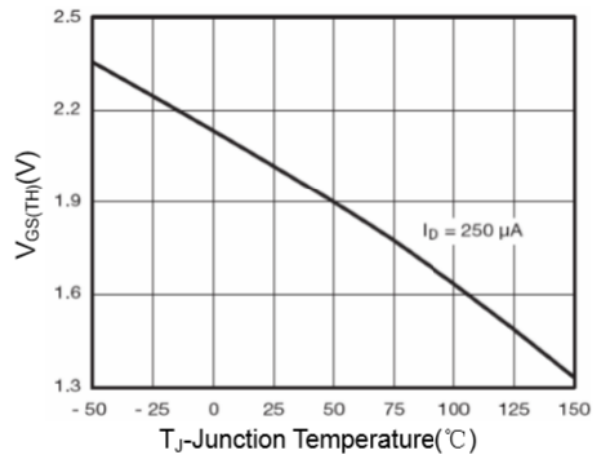


Figure 10 V<sub>GS(th)</sub> vs Junction Temperature

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