



**PRODUCT SUMMARY**

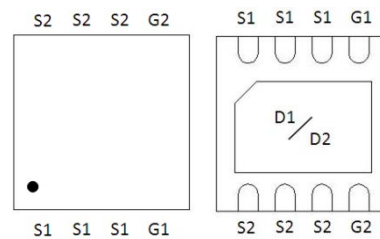
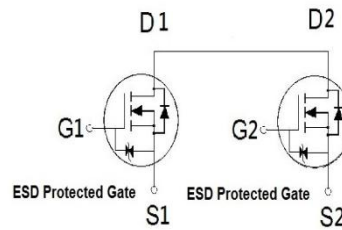
$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$
12V	4.5mΩ	55A

**Features**

- Pb-Free, Halogen Free and RoHS compliant.
- Low  $R_{DS(on)}$  to Minimize Conduction Losses.
- Ohmic Region Good  $R_{DS(on)}$  Ratio.
- Optimized Gate Charge to Minimize Switching Losses.
- Products Integrated ESD diode

**Applications**

- Protection Circuits Applications.
- Portable Devices for Battery PACK Applications.



**ABSOLUTE MAXIMUM RATINGS ( $T_A = 25\text{ °C}$  Unless Otherwise Noted)**

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		$V_{DS}$	12	V
Gate-Source Voltage		$V_{GS}$	±12	V
Continuous Drain Current <sup>2</sup>	$T_C = 25\text{ °C}$	$I_D$	55	A
	$T_C = 100\text{ °C}$		35	
	$T_A = 25\text{ °C}$		17	
	$T_A = 70\text{ °C}$		13	
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	80	
Avalanche Current		$I_{AS}$	33	
Avalanche Energy	$L = 0.1\text{mH}$	$E_{AS}$	54	mJ
Power Dissipation	$T_C = 25\text{ °C}$	$P_D$	28	W
	$T_C = 100\text{ °C}$		11	
	$T_A = 25\text{ °C}$		2.5	
	$T_A = 70\text{ °C}$		1.6	
Operating Junction & Storage Temperature Range		$T_j, T_{stg}$	-55 to 150	°C

**THERMAL RESISTANCE RATINGS**

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient <sup>3</sup>	$R_{\theta JA}$		50	°C/W
Junction-to-case	$R_{\theta JC}$		4.5	

<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>Package limitation current is 20A.

<sup>3</sup>The value of  $R_{\theta JA}$  is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25\text{ °C}$ .

**ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25 °C, Unless Otherwise Noted)**

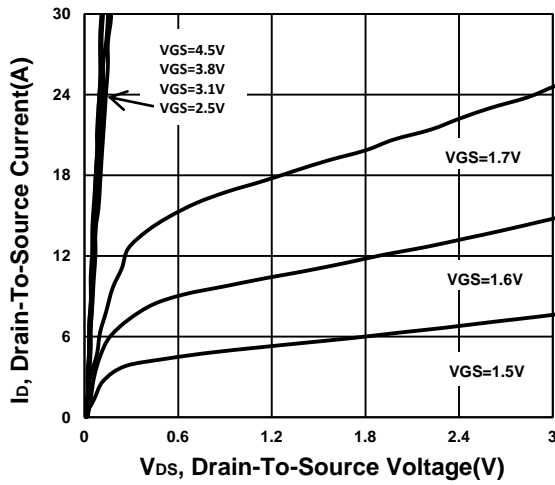
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT		
			MIN	TYP	MAX			
<b>STATIC</b>								
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	12			V		
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	0.6	0.9	1.2			
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±10V			±10	μA		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V			1	μA		
		V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125 °C			10			
Drain-Source On-State Resistance <sup>1</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3A		3.4	4.5	mΩ		
		V <sub>GS</sub> = 3.8V, I <sub>D</sub> = 3A		3.6	5.1			
		V <sub>GS</sub> = 3.1V, I <sub>D</sub> = 3A		4.1	5.8			
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 3A		4.9	7			
Forward Transconductance <sup>1</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 3A		42.5		S		
<b>DYNAMIC</b>								
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 6V, f = 1MHz		1782		pF		
Output Capacitance	C <sub>oss</sub>			555				
Reverse Transfer Capacitance	C <sub>rss</sub>			379				
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz		2		Ω		
Total Gate Charge <sup>2</sup>	Q <sub>g(VGS=4.5V)</sub>	V <sub>DS</sub> = 6V, I <sub>D</sub> = 3A		17		nC		
	Q <sub>g(VGS=3.8V)</sub>			15				
Gate-Source Charge <sup>2</sup>	Q <sub>gs</sub>			2.5				
Gate-Drain Charge <sup>2</sup>	Q <sub>gd</sub>			4.1				
Turn-On Delay Time <sup>2</sup>	t <sub>d(on)</sub>		V <sub>DD</sub> = 6V I <sub>D</sub> ≅ 3A, V <sub>GEN</sub> = 4.5V, R <sub>G</sub> = 6Ω		36			nS
Rise Time <sup>2</sup>	t <sub>r</sub>				90			
Turn-Off Delay Time <sup>2</sup>	t <sub>d(off)</sub>			63				
Fall Time <sup>2</sup>	t <sub>f</sub>			47				
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>J</sub> = 25 °C)</b>								
Continuous Current <sup>3</sup>	I <sub>S</sub>				23	A		
Forward Voltage <sup>1</sup>	V <sub>SD</sub>	I <sub>F</sub> = 3A, V <sub>GS</sub> = 0V			1.2	V		
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 3A, dI <sub>F</sub> /dt = 100A / μS		47		nS		
Reverse Recovery Charge	Q <sub>rr</sub>			22		nC		

<sup>1</sup>Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

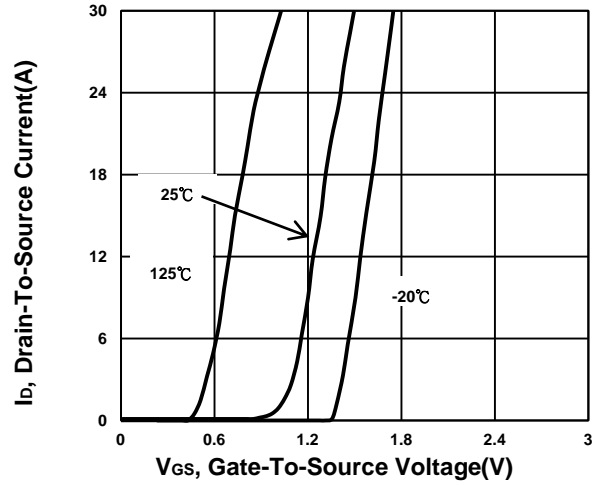
<sup>2</sup>Independent of operating temperature.

<sup>3</sup>Package limitation current is 20A.

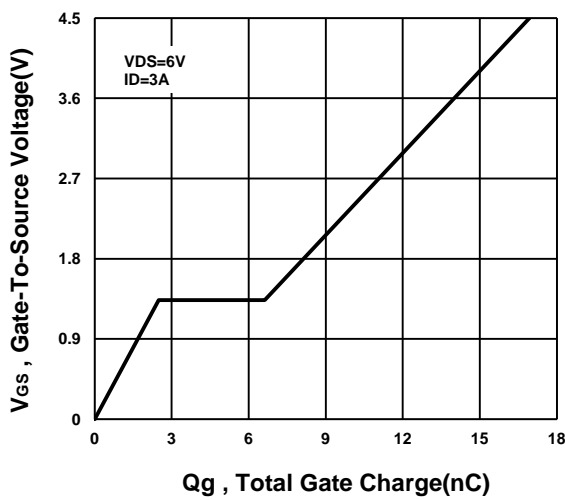
**Output Characteristics**



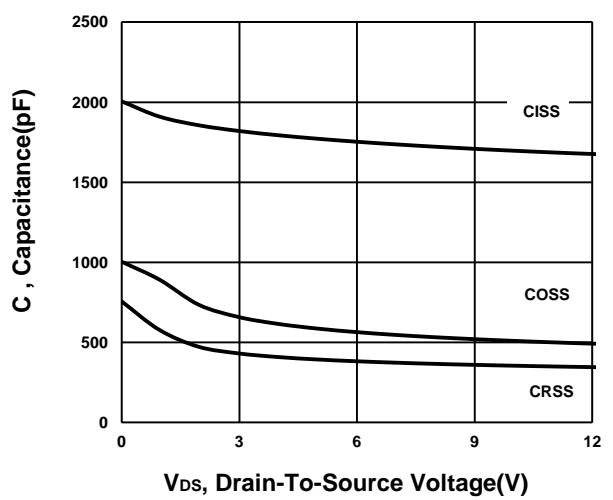
**Transfer Characteristics**



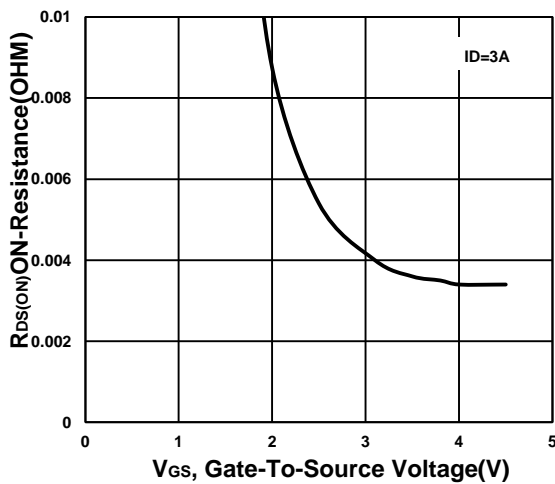
**Gate charge Characteristics**



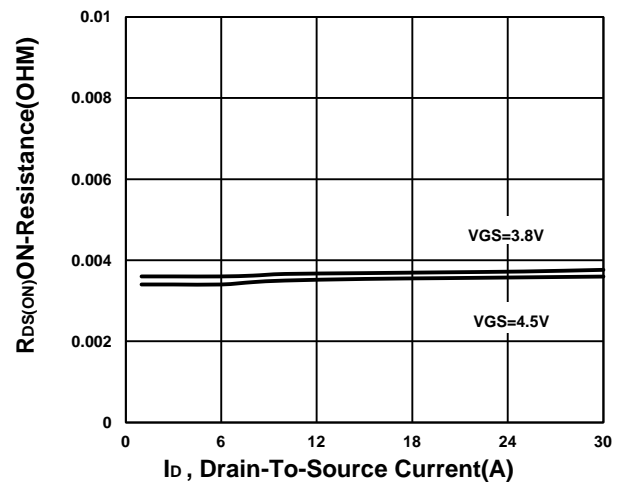
**Capacitance Characteristic**



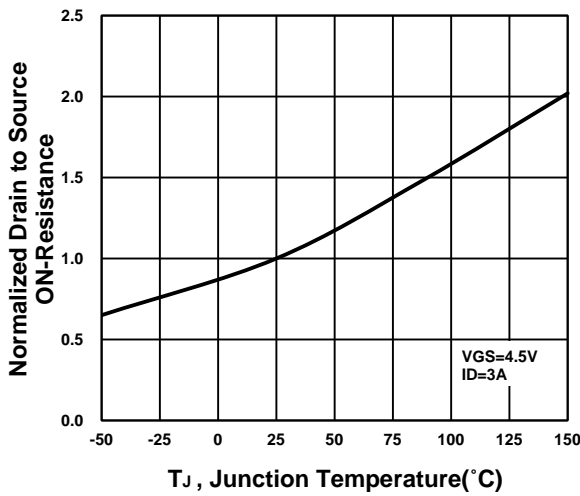
**On-Resistance VS Gate-To-Source Voltage**



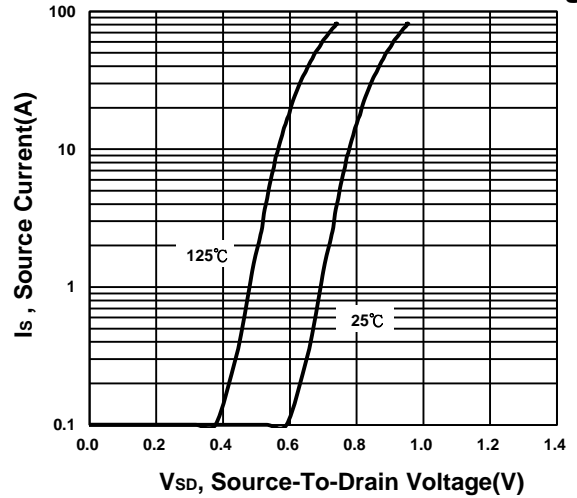
**On-Resistance VS Drain Current**



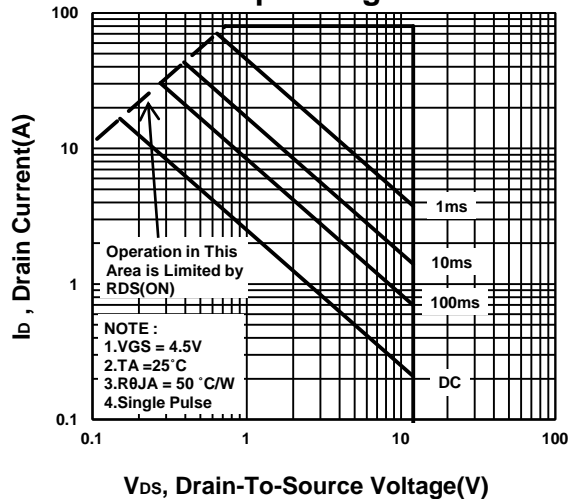
**On-Resistance VS Temperature**



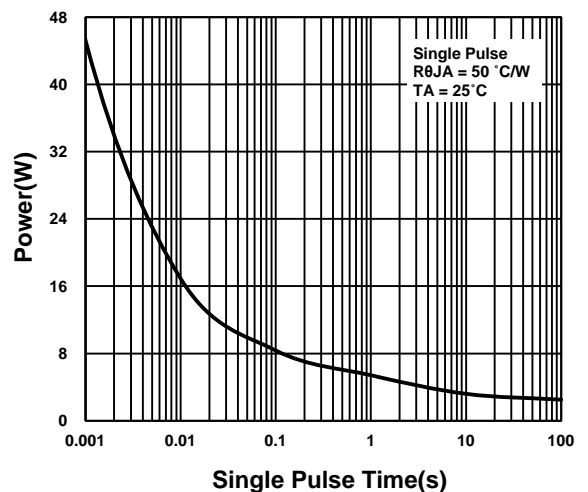
**Source-Drain Diode Forward Voltage**



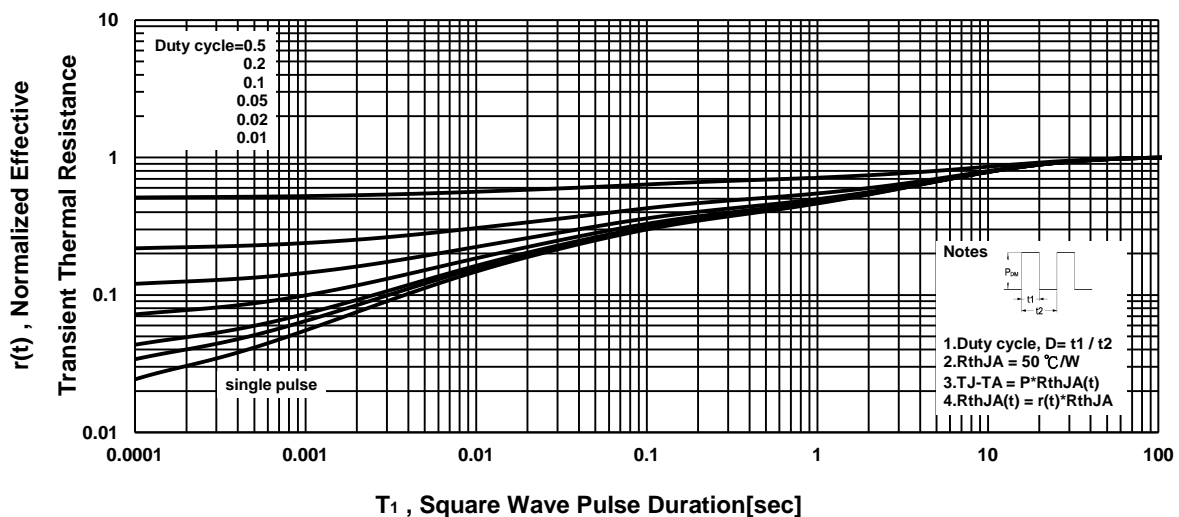
**Safe Operating Area**



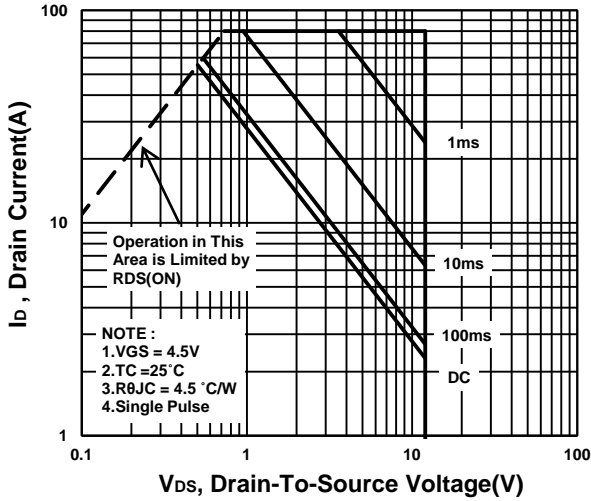
**Single Pulse Maximum Power Dissipation**



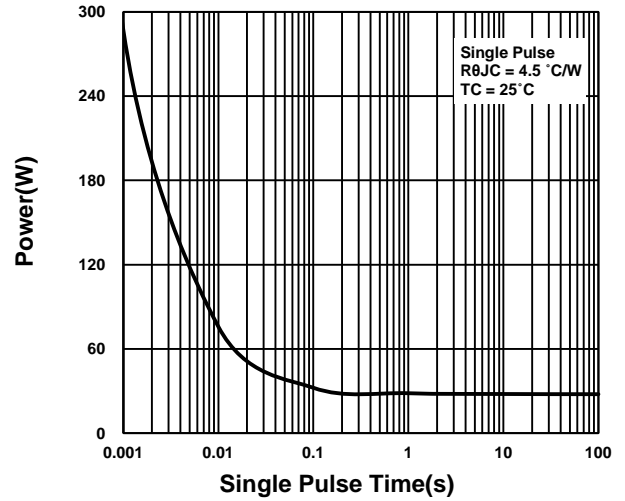
**Transient Thermal Response Curve**



**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**



**Transient Thermal Response Curve**

