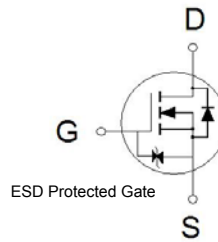


**PRODUCT SUMMARY**

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$
24V	5mΩ	59A

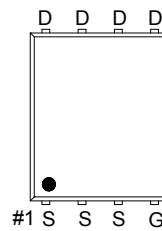


**Features**

- 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 with ESD Protected.

**Applications**

- Protection Circuits Applications.
- Logic/Load Switch Circuits Applications.



G. GATE  
D. DRAIN  
S. SOURCE

100% UIS Tested  
100% Rg Tested

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		$V_{DS}$	24	V
Gate-Source Voltage		$V_{GS}$	±12	V
Continuous Drain Current <sup>4</sup>	$T_C = 25\text{ °C}$	$I_D$	59	A
	$T_C = 100\text{ °C}$		37	
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	120	
Continuous Drain Current	$T_A = 25\text{ °C}$	$I_D$	20	
	$T_A = 70\text{ °C}$		16	
Avalanche Current		$I_{AS}$	31	
Avalanche Energy	$L = 0.1\text{mH}$	$E_{AS}$	48	mJ
Power Dissipation	$T_C = 25\text{ °C}$	$P_D$	31	W
	$T_C = 100\text{ °C}$		12	
Power Dissipation <sup>3</sup>	$T_A = 25\text{ °C}$	$P_D$	3.5	W
	$T_A = 70\text{ °C}$		2.2	
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>2</sup>	$t \leq 10s$	$R_{\theta JA}$		35	°C / W
Junction-to-Ambient <sup>2</sup>	Steady-State	$R_{\theta JA}$		58	
Junction-to-Case	Steady-State	$R_{\theta JC}$		4	

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

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

<sup>3</sup>The Power dissipation is based on  $R_{\theta JA} t \leq 10s$  value.

<sup>4</sup>Package limitation current is 51A.

**ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ C$ , Unless Otherwise Noted)**

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	24			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.7	0.9	1.3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 10V$			$\pm 30$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$			1	$\mu A$
		$V_{DS} = 20V, V_{GS} = 0V, T_J = 55^\circ C$			10	
Drain-Source On-State Resistance <sup>1</sup>	$R_{DS(ON)}$	$V_{GS} = 2.5V, I_D = 10A$		5.6	8.5	m $\Omega$
		$V_{GS} = 4.5V, I_D = 10A$		3.9	5.5	
		$V_{GS} = 10V, I_D = 15A$		3.3	5	
Forward Transconductance <sup>1</sup>	$g_{fs}$	$V_{DS} = 5V, I_D = 15A$		76		S
<b>DYNAMIC</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 12V, f = 1MHz$		1842		pF
Output Capacitance	$C_{oss}$			297		
Reverse Transfer Capacitance	$C_{rss}$			232		
Gate Resistance	$R_g$	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$		1.8		$\Omega$
Total Gate Charge <sup>2</sup>	$Q_g$	$V_{GS} = 10V$	$V_{DS} = 12V, I_D = 15A$	42		nC
		$V_{GS} = 4.5V$		20		
Gate-Source Charge <sup>2</sup>	$Q_{gs}$	2.2				
Gate-Drain Charge <sup>2</sup>	$Q_{gd}$	6.7				
Turn-On Delay Time <sup>2</sup>	$t_{d(on)}$	$V_{DS} = 12V, I_D \cong 15A, V_{GS} = 10V, R_{GEN} = 6\Omega$		13		nS
Rise Time <sup>2</sup>	$t_r$			89		
Turn-Off Delay Time <sup>2</sup>	$t_{d(off)}$			77		
Fall Time <sup>2</sup>	$t_f$			136		

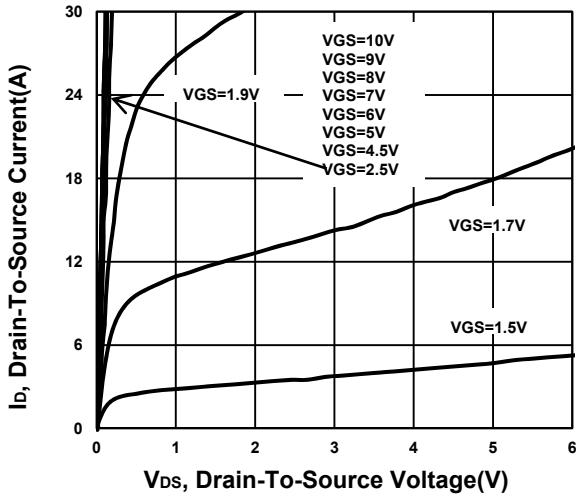
**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>J</sub> = 25 °C)**

Continuous Current	I <sub>S</sub>			25	A
Forward Voltage <sup>1</sup>	V <sub>SD</sub>	I <sub>F</sub> = 15A, V <sub>GS</sub> = 0V		1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 15A, di <sub>F</sub> /dt = 100A / μS		22	nS
Reverse Recovery Charge	Q <sub>rr</sub>			7.7	nC

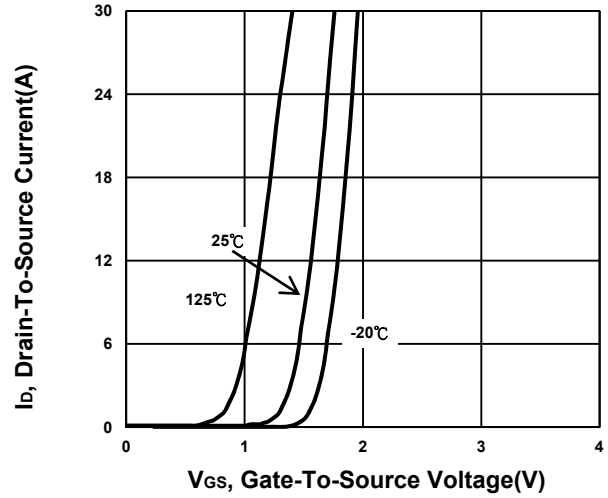
<sup>1</sup>Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

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

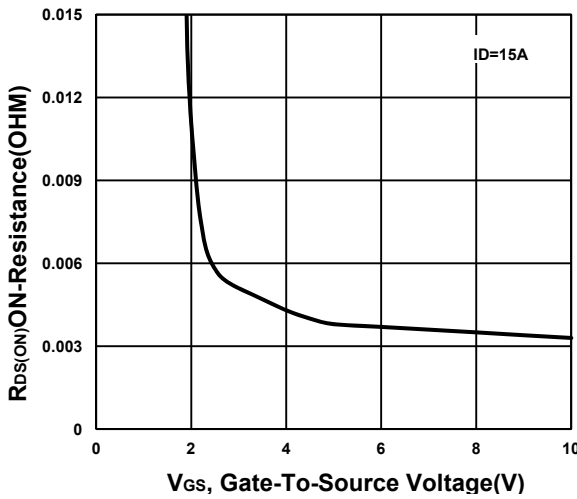
**Output Characteristics**



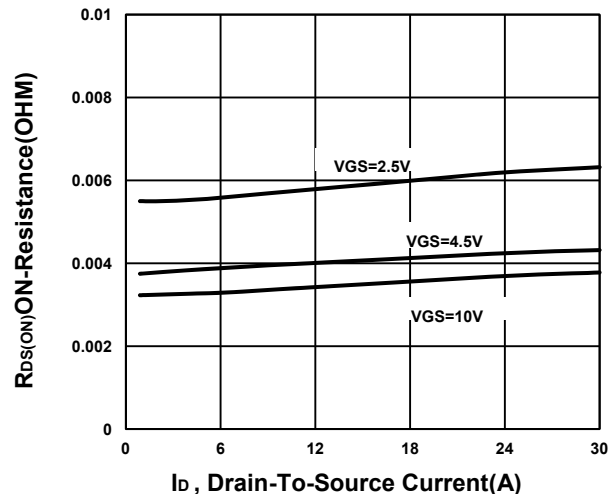
**Transfer Characteristics**



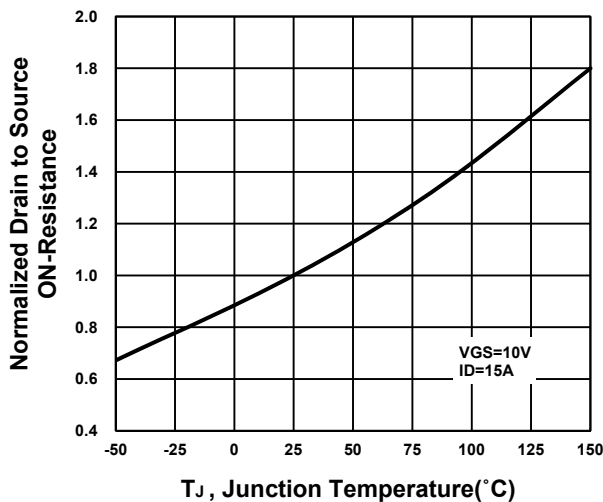
**On-Resistance VS Gate-To-Source**



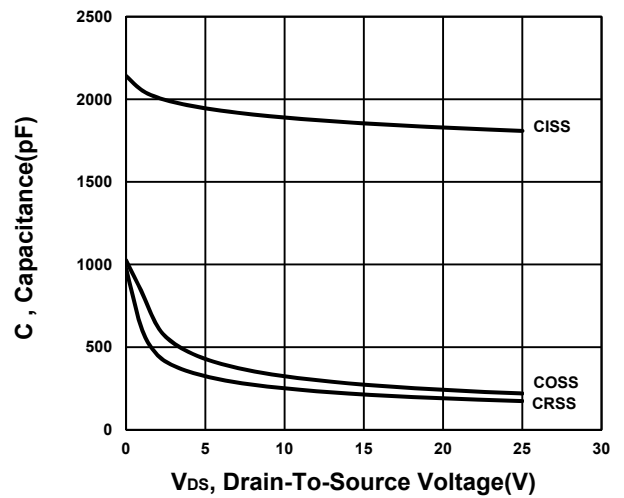
**On-Resistance VS Drain Current**



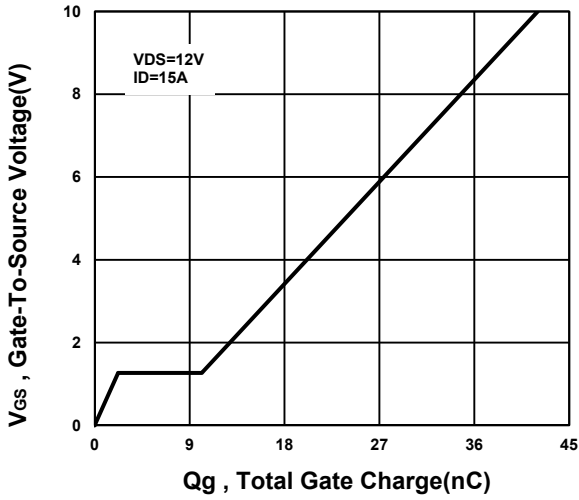
**On-Resistance VS Temperature**



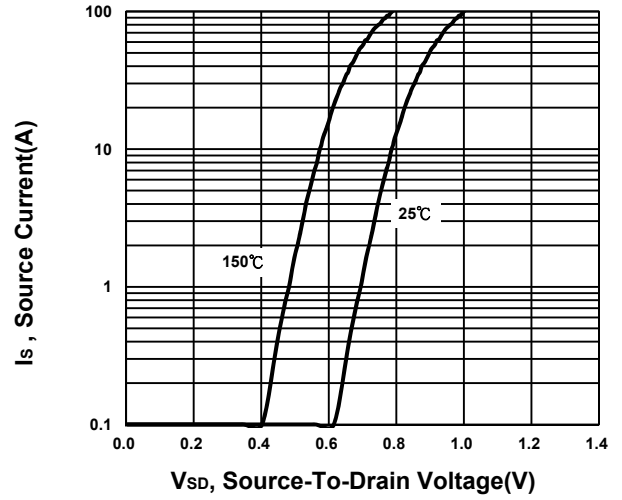
**Capacitance Characteristic**



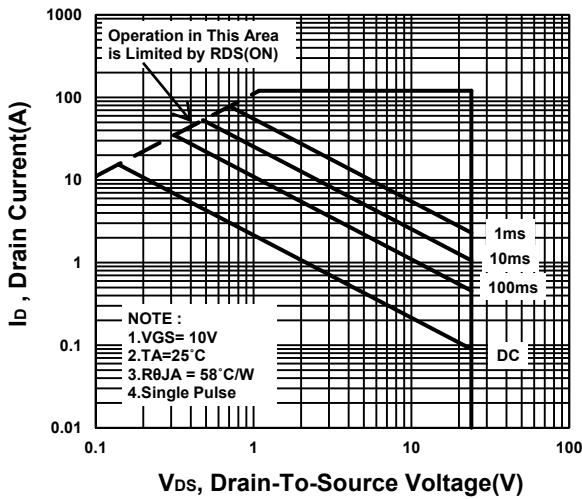
**Gate charge Characteristics**



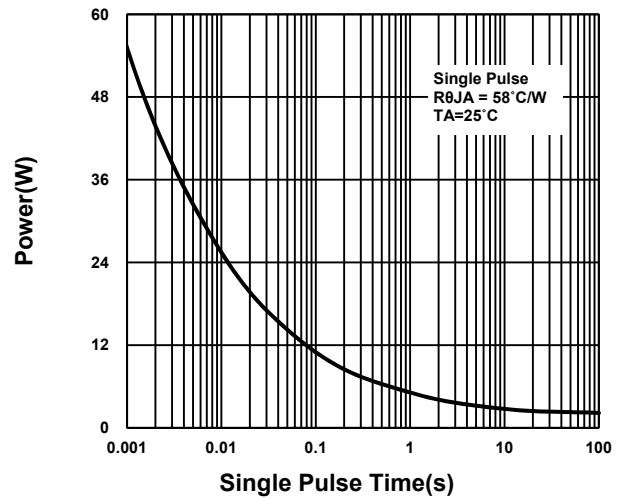
**Source-Drain Diode Forward Voltage**



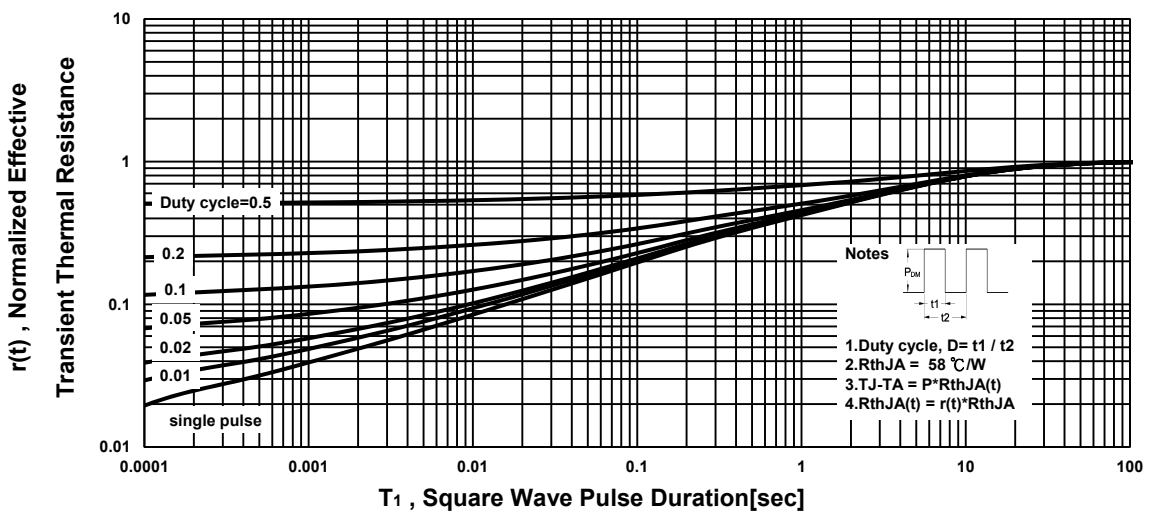
**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**



**Transient Thermal Response Curve**



**Transient Thermal Response Curve**

