

**Features**

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

**Product Summary**



$V_{DS}$	-60	V
$I_D$	-4	A
$R_{DS(ON)}$ (at $V_{GS}=-10V$ )	120	m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$ )	170	m $\Omega$

**Applications**

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch



**Absolute Maximum Ratings( $T_c=25^{\circ}C$ , unless otherwise noted)**

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	-60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D$	-4	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	-12	A
Total Power Dissipation <sup>4</sup>	$P_D$	1.5	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^{\circ}C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^{\circ}C$

**Thermal Characteristics**

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	---	83.3	$^{\circ}C/W$

**Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4A$	---	105	120	$m\Omega$
		$V_{GS}=-4.5V, I_D=-3A$	---	135	170	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.5	-2.2	-3.0	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-60V, V_{GS}=0V$	---	---	-1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
Total Gate Charge	$Q_g$	$V_{DS}=-30V, V_{GS}=-10V, I_D=-4A$	---	25	---	nC
Gate-Source Charge	$Q_{gs}$		---	3	---	
Gate-Drain Charge	$Q_{gd}$		---	7	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=-30V, V_{GS}=-10V, R_G=3\Omega, I_D=-1A$	---	8	---	ns
Rise Time	$T_r$		---	4	---	
Turn-Off Delay Time	$T_{d(off)}$		---	32	---	
Fall Time	$T_f$		---	7	---	
Input Capacitance	$C_{iss}$	$V_{DS}=-30V, V_{GS}=0V, f=1\text{MHz}$	---	930	---	pF
Output Capacitance	$C_{oss}$		---	85	---	
Reverse Transfer Capacitance	$C_{rss}$		---	35	---	

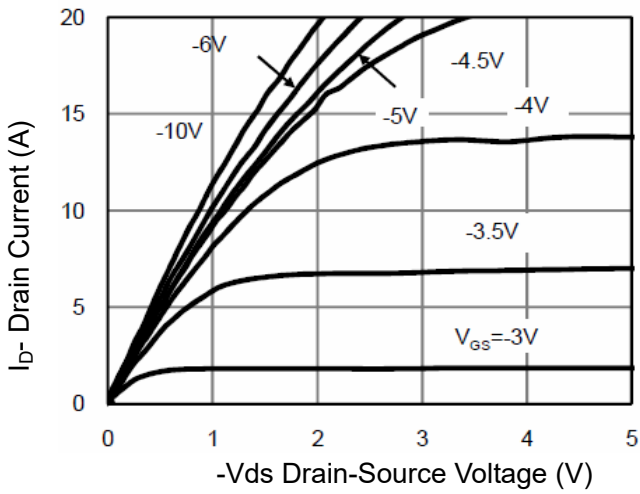
**Drain-Source Diode Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current <sup>1</sup>	$I_S$		---	---	-4	A
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-4A, T_J=25^{\circ}\text{C}$	---	---	-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=-4A, di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	25	---	nS
Reverse Recovery Charge	$Q_{rr}$		---	31	---	nC

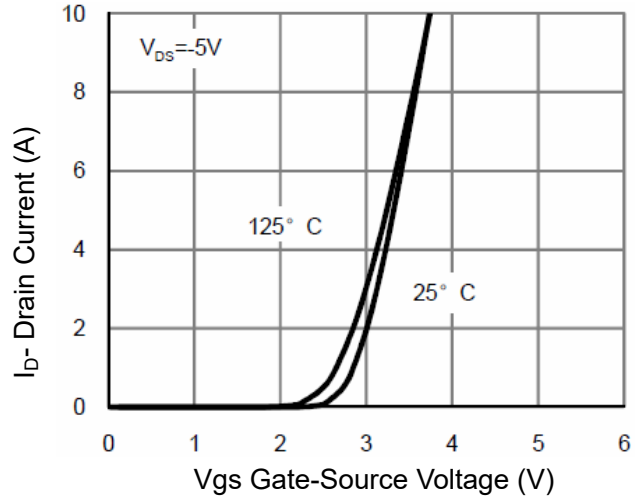
**Note:**

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The power dissipation is limited by 150 $^{\circ}\text{C}$  junction temperature

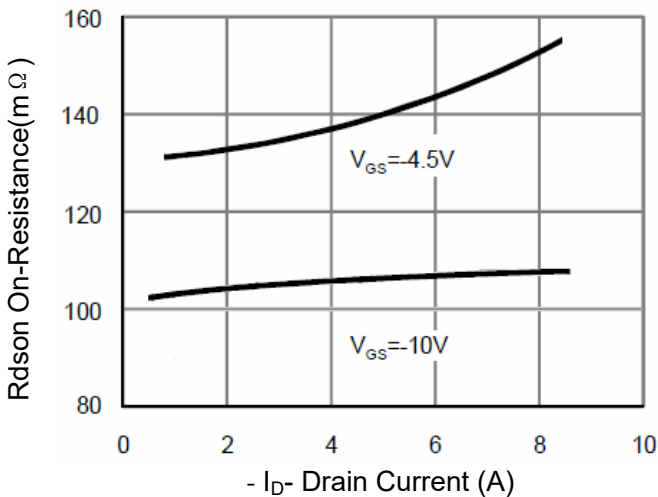
**Typical Characteristics**



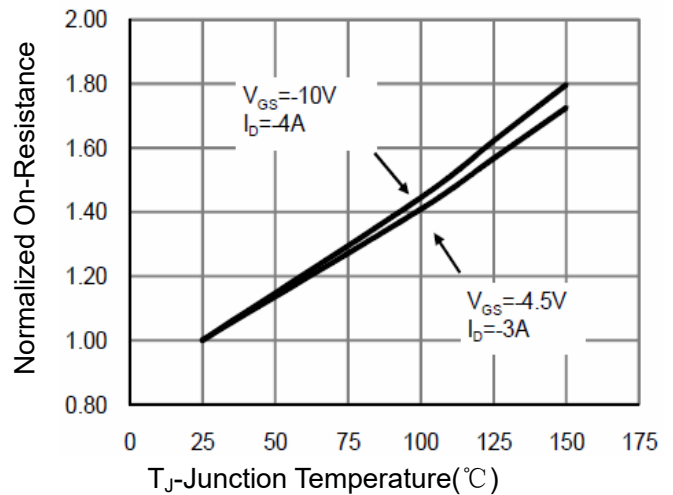
**Figure 1 Output Characteristics**



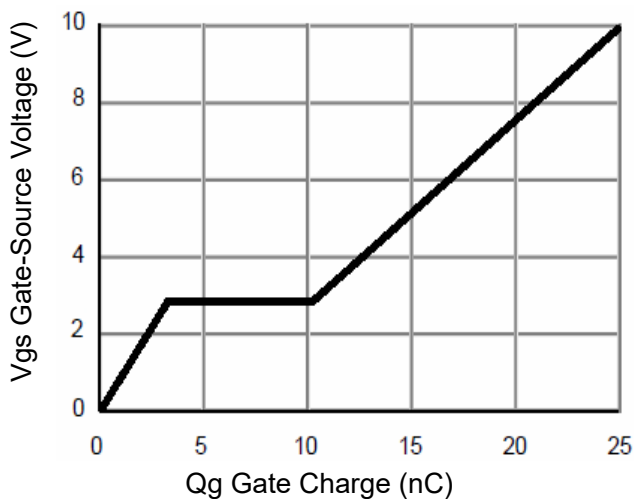
**Figure 2 Transfer Characteristics**



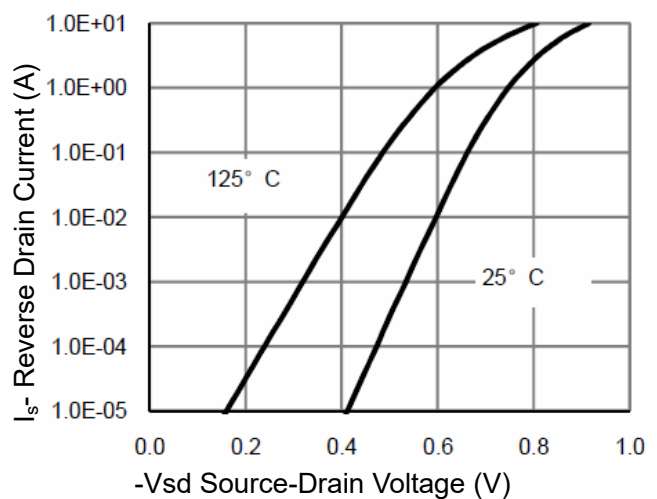
**Figure 3 Rdson- Drain Current**



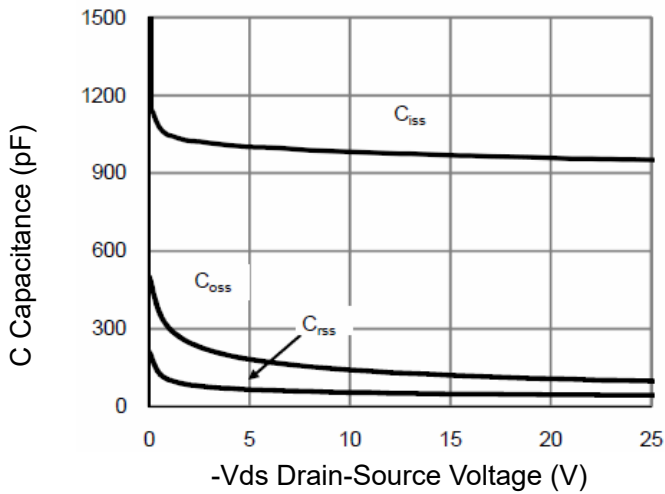
**Figure 4 Rdson-Junction Temperature**



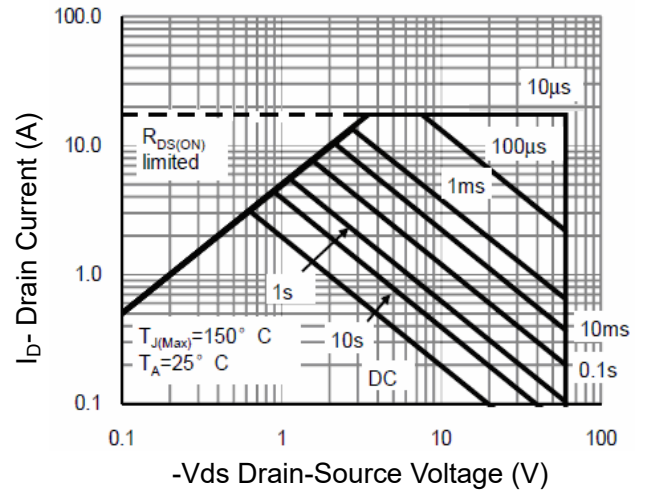
**Figure 5 Gate Charge**



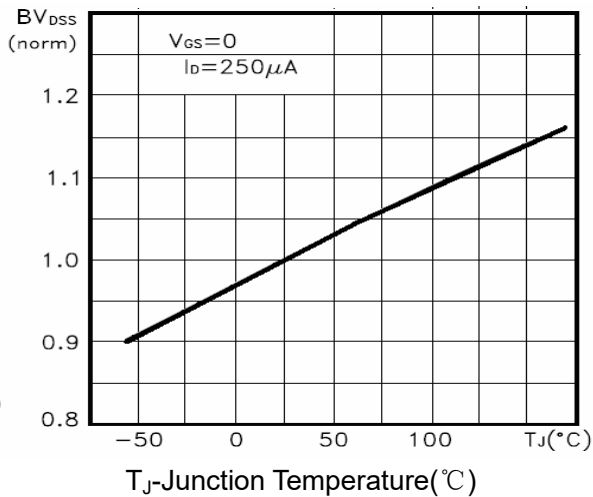
**Figure 6 Source- Drain Diode Forward**



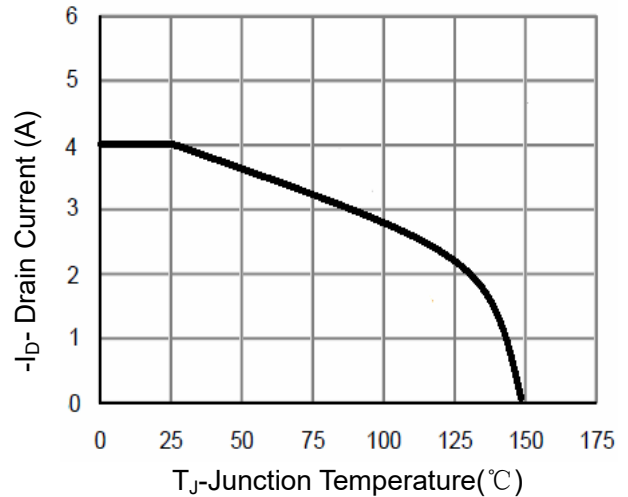
**Figure 7 Capacitance vs Vds**



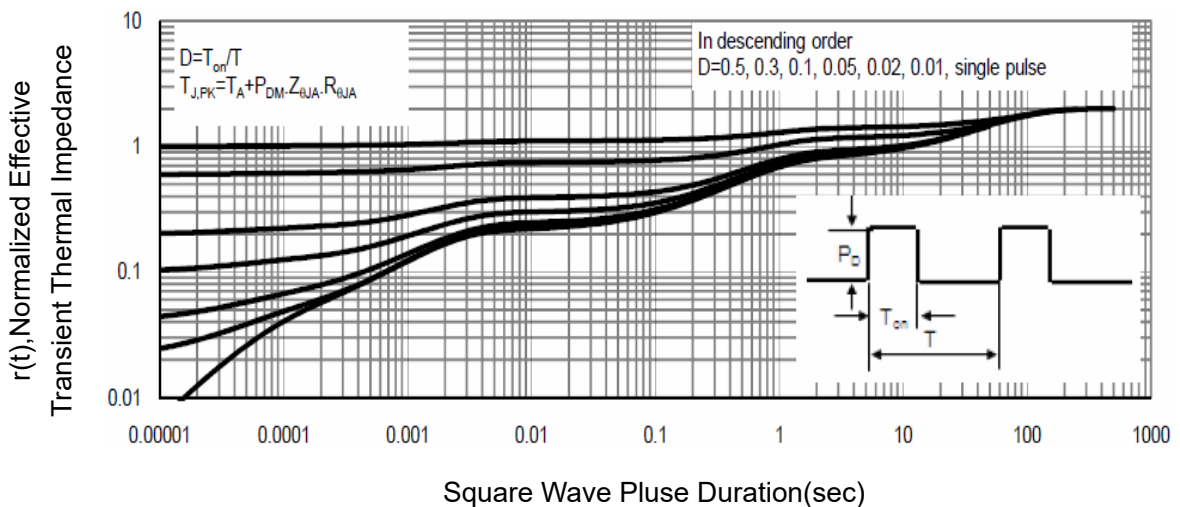
**Figure 8 Safe Operation Area**



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

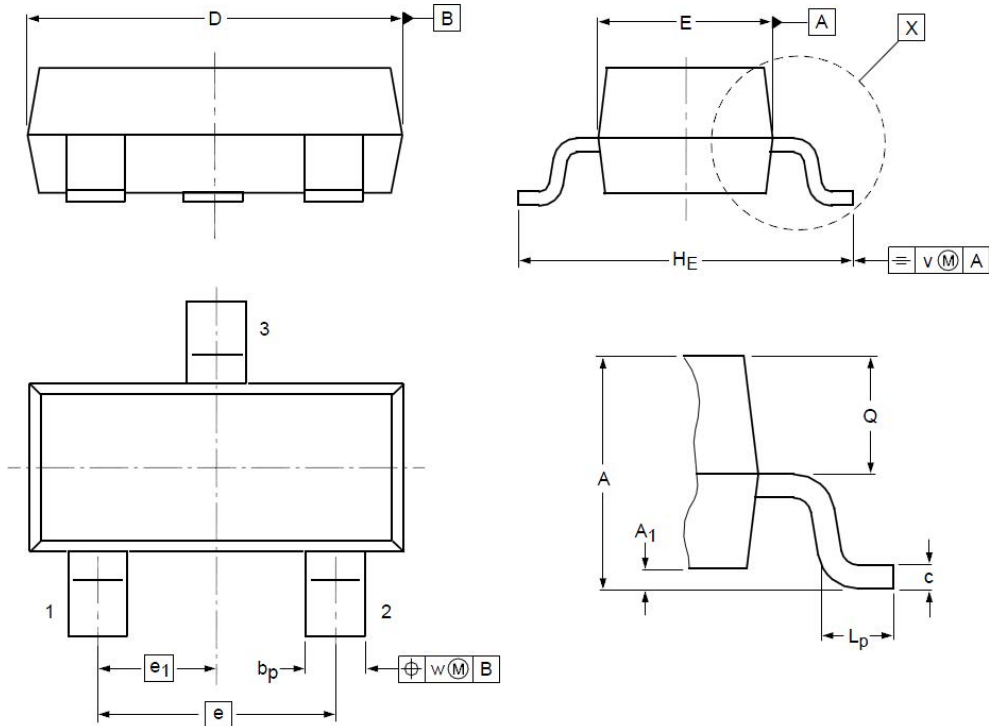


**Figure 10 ID Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

**SOT23-3L Package Outline Dimensions**



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
<b>A</b>	0.90	1.07	1.25	<b>e<sub>1</sub></b>	--	0.95	--
<b>A<sub>1</sub></b>	0.01	0.05	0.10	<b>H<sub>E</sub></b>	2.50	2.80	3.00
<b>b<sub>p</sub></b>	0.30	0.40	0.50	<b>L<sub>p</sub></b>	0.30	0.45	0.60
<b>c</b>	0.10	0.15	0.20	<b>Q</b>	0.23	0.28	0.33
<b>D</b>	2.70	2.90	3.10	<b>V</b>	--	0.20	--
<b>E</b>	1.40	1.55	1.75	<b>W</b>	--	0.20	--
<b>e</b>	--	1.90	--				