

**Features**

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

**Product Summary**



$V_{DS}$	-20	V
$I_D$	-4.1	A
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$ )	45	m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=-2.5V$ )	60	m $\Omega$

**Applications**

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



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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D@T_C=25^{\circ}C$	-4.1	A
Continuous Drain Current	$I_D@T_C=70^{\circ}C$	-3.2	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	-15	A
Total Power Dissipation	$P_D$	1.7	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>	$R_{\theta JA}$	---	74	$^{\circ}C/W$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-4.1A$	---	34	45	$m\Omega$
		$V_{GS}=-2.5V, I_D=-3A$	---	44	60	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.45	-0.7	-1	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	$\pm 100$	nA
Forward Transconductance	$g_{fs}$	$V_{DS}=-5V, I_D=-4.1A$	---	6	---	S
Total Gate Charge	$Q_g$	$V_{DS}=-4V, V_{GS}=-4.5V, I_D=-4.1A$	---	7.8	---	nC
Gate-Source Charge	$Q_{gs}$		---	1.2	---	
Gate-Drain Charge	$Q_{gd}$		---	1.6	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=-4V, R_L=1.2\Omega, V_{GS}=-4.5V, R_G=1\Omega$	---	12	---	ns
Rise Time	$T_r$		---	35	---	
Turn-Off Delay Time	$T_{d(off)}$		---	30	---	
Fall Time	$T_f$		---	10	---	
Input Capacitance	$C_{iss}$	$V_{DS}=-4V, V_{GS}=0V, f=1\text{MHz}$	---	740	---	pF
Output Capacitance	$C_{oss}$		---	290	---	
Reverse Transfer Capacitance	$C_{rss}$		---	190	---	

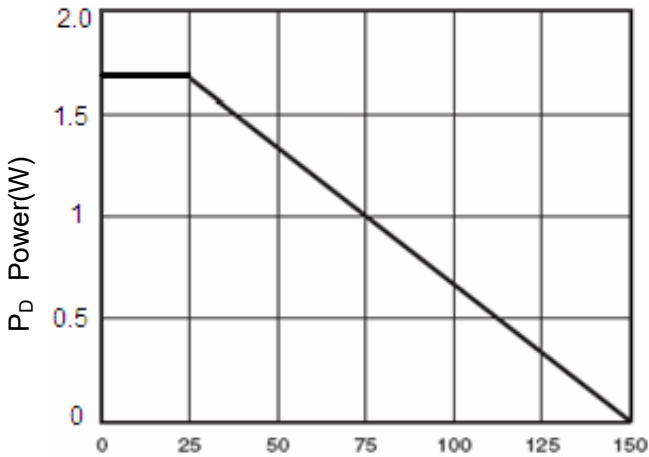
**Drain-Source Diode Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current <sup>2</sup>	$I_S$		---	---	-4.1	A
Diode Forward Voltage <sup>1</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-4.1A, T_J=25^\circ\text{C}$	---	---	-1.2	V

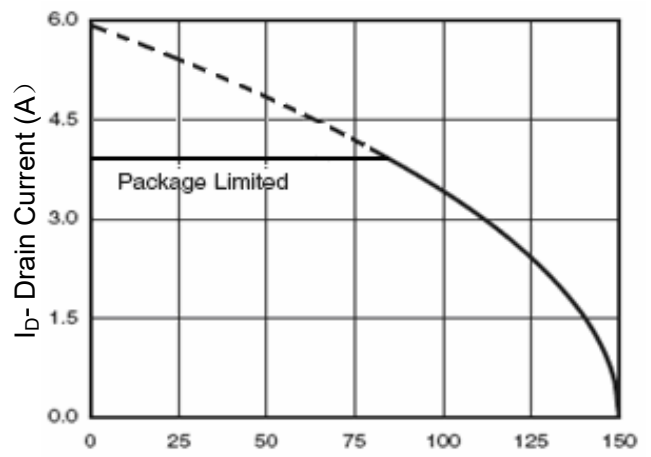
**Note:**

- 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  $\leq 2\%$

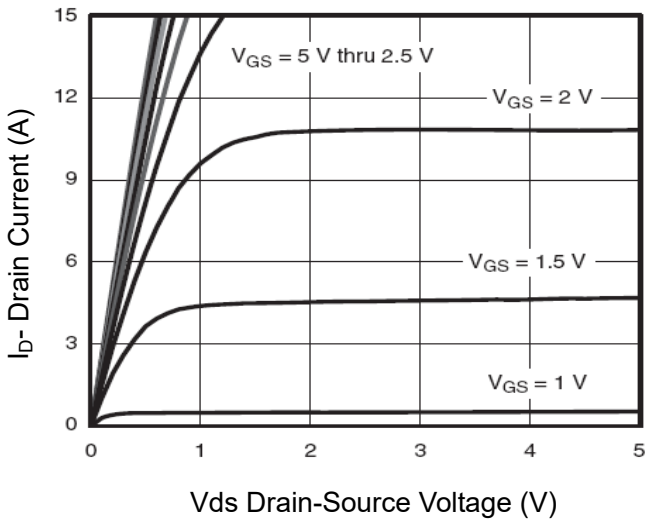
**Typical Characteristics**



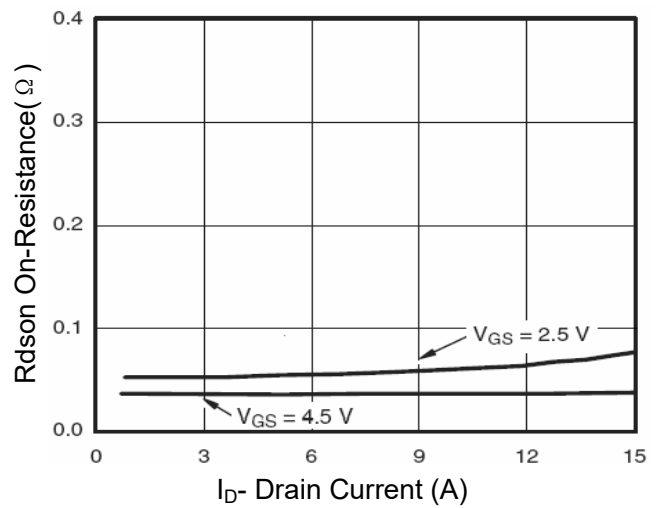
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 1 Power Dissipation**



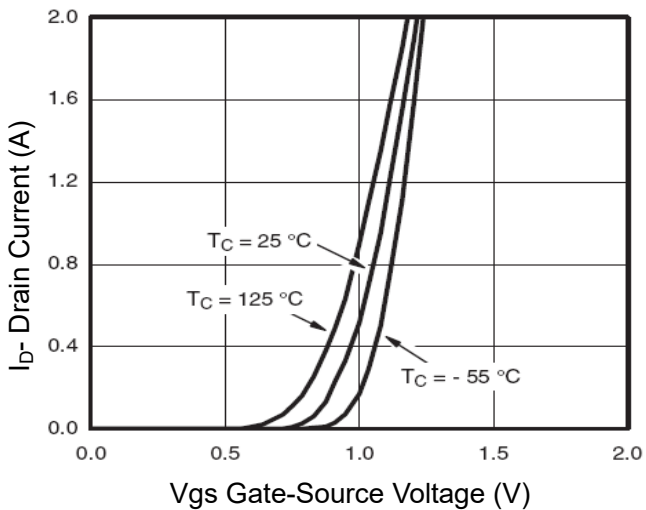
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 2 Drain Current**



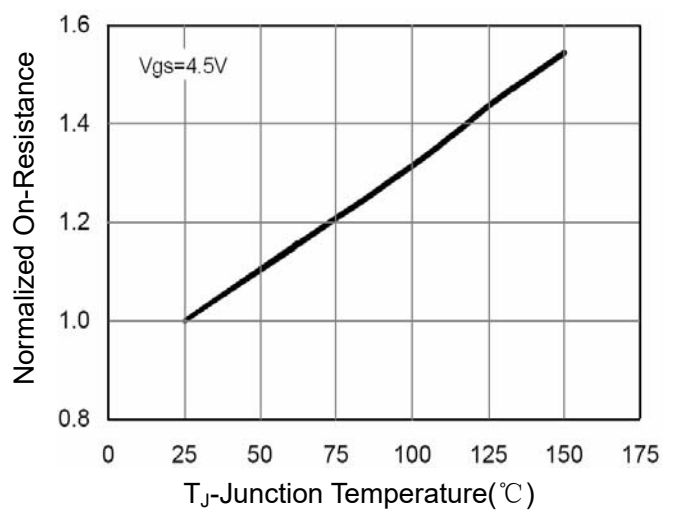
V<sub>ds</sub> Drain-Source Voltage (V)  
**Figure 3 Output Characteristics**



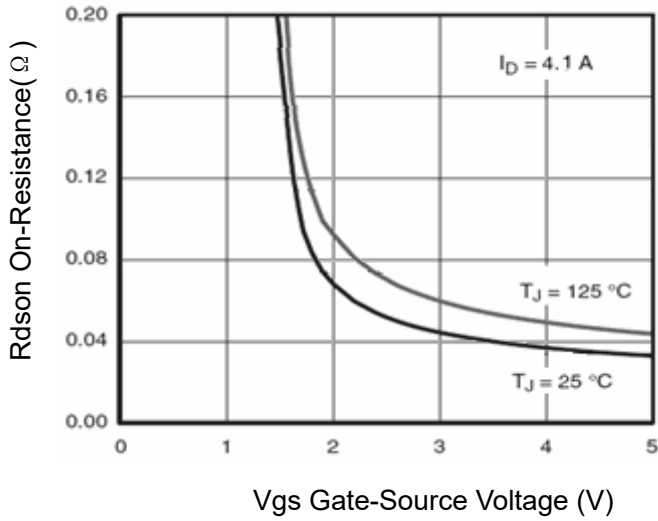
**Figure 4 Drain-Source On-Resistance**



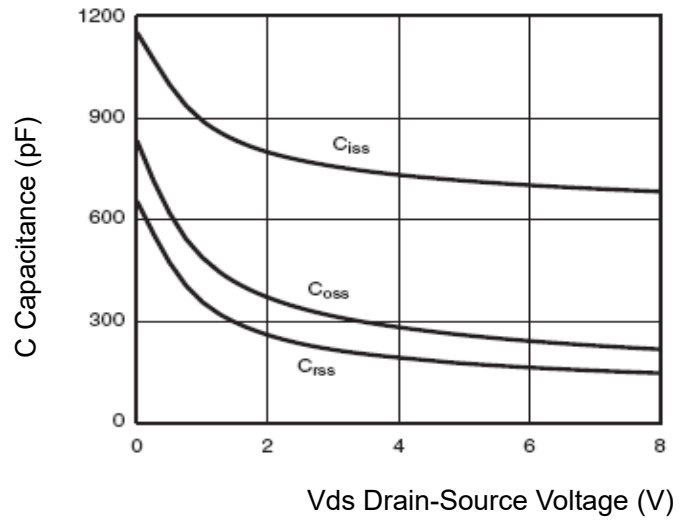
**Figure 5 Transfer Characteristics**



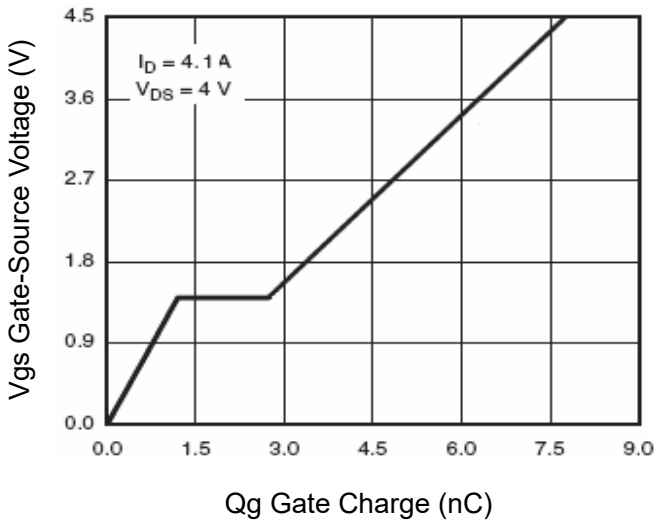
**Figure 6 Drain-Source On-Resistance**



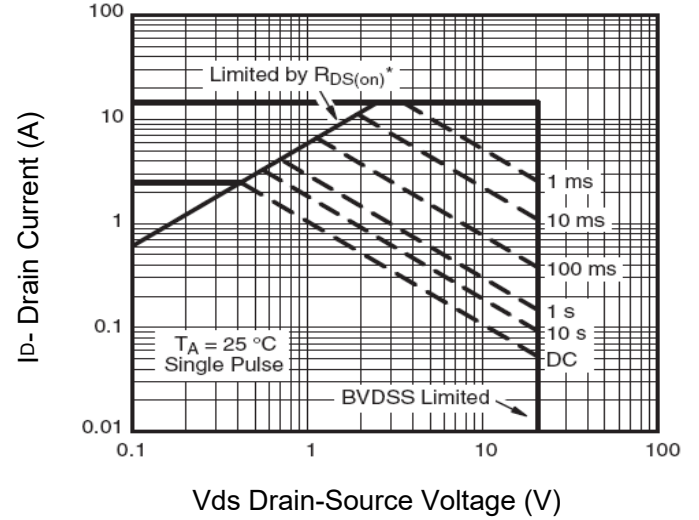
**Figure 7 Rdson vs Vgs**



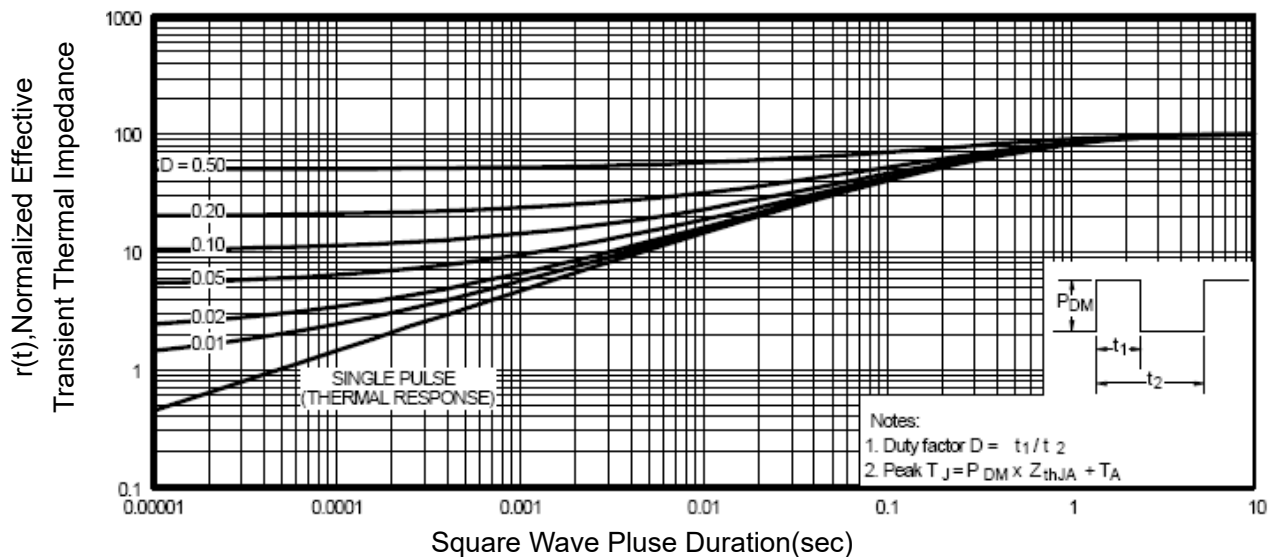
**Figure 8 Capacitance vs Vds**



**Figure 9 Gate Charge**

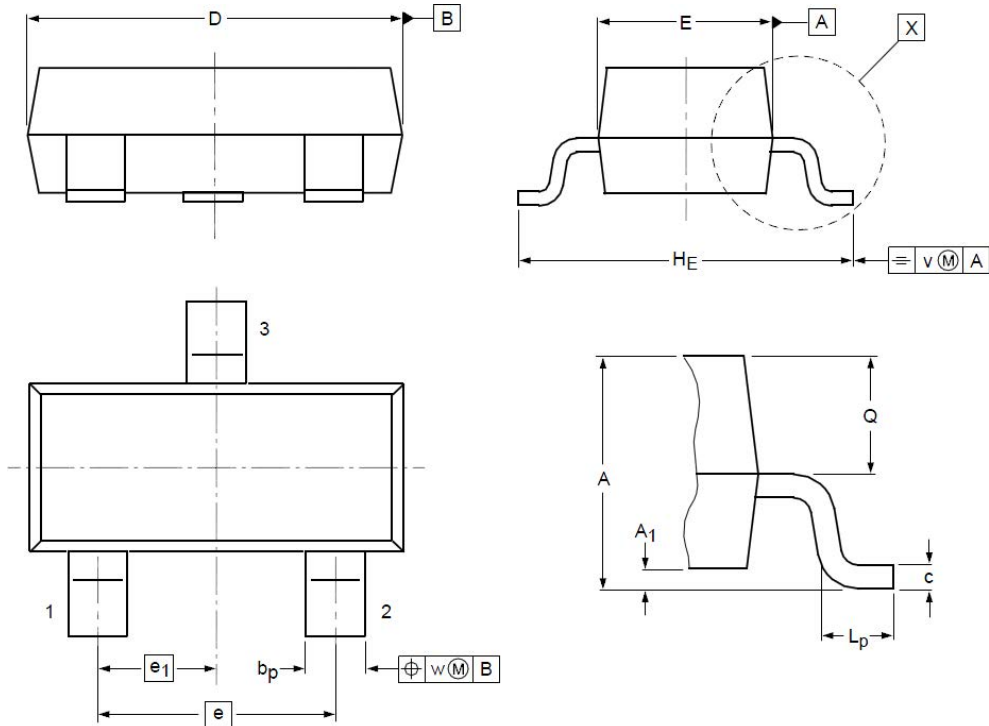


**Figure 10 Safe Operation Area**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

**SOT23 Package Outline Dimensions**



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
<b>A</b>	0.90	1.05	1.20	<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>	2.10	2.40	2.50
<b>b<sub>p</sub></b>	0.38	0.42	0.48	<b>L<sub>p</sub></b>	0.40	0.50	0.60
<b>c</b>	0.09	0.13	0.15	<b>Q</b>	0.45	0.49	0.55
<b>D</b>	2.80	2.92	3.00	<b>V</b>	--	0.20	--
<b>E</b>	1.20	1.33	1.40	<b>W</b>	--	0.10	--
<b>e</b>	--	1.90	--				