

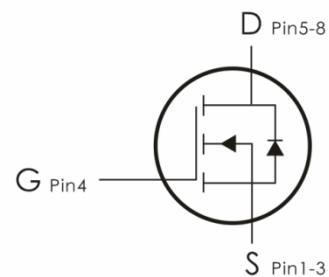
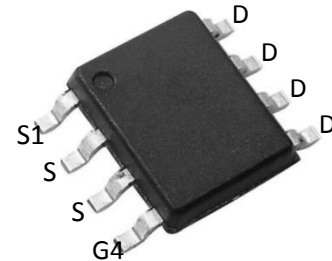
### Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge.

It can be used in a wide variety of applications.

### Features:

- 1)  $V_{DS}=40V, I_D=12A, R_{DS(ON)} < 12m\ \Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.



### Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_C=25^\circ C$ )	12	A
	Drain Current - Continuous ( $T_C=100^\circ C$ )	8.5	
$I_{DM}$	Drain Current - Pulsed <sup>1</sup>	60	
$P_D$	Power Dissipation ( $T_C=25^\circ C$ )	3	W
	Power Dissipation - Derate above $25^\circ C$	---	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

### Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	---	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient <sup>2</sup>	41.7	

Electrical Characteristics: ( $T_C=25^\circ\text{C}$  unless otherwise noted)

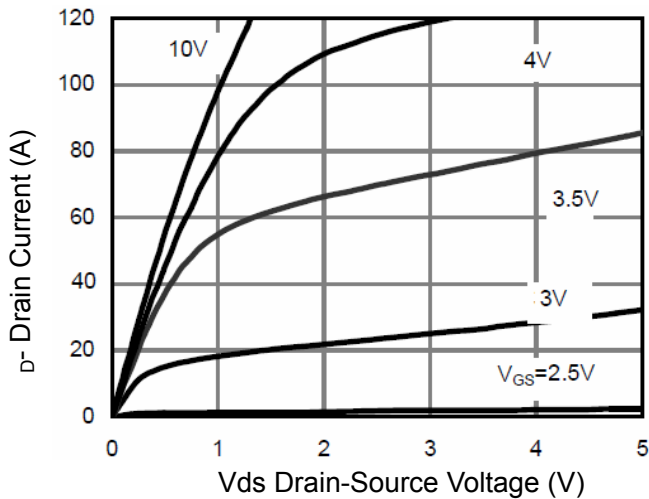
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	40	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=40V, V_{GS}=0V$	---	---	1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.2	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	8.4	12	m $\Omega$
		$V_{GS}=4.5V, I_D=8A$	---	12.3	18	
$G_{FS}$	Forward Transconductance	$V_{DS}=5V, I_D=10A$	---	75	---	S
<b>Dynamic Characteristics<sup>4</sup></b>						
$C_{iss}$	Input Capacitance	$V_{DS}=20V, V_{GS}=0V, f=1\text{MHz}$	---	1780	---	pF
$C_{oss}$	Output Capacitance		---	209	---	
$C_{rss}$	Reverse Transfer Capacitance		---	160	---	
<b>Switching Characteristics<sup>4</sup></b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=20V, R_{GEN}=3\ \Omega, V_{GS}=10V$	---	6.4	---	ns
$t_r$	Rise Time		---	17.2	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	29.6	---	ns
$t_f$	Fall Time		---	16.8	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=20V, I_D=10A$	---	30	---	nC
$Q_{gs}$	Gate-Source Charge		---	4.2	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	9.5	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage <sup>3</sup>	$V_{GS}=0V, I_S=10A, T_J=25^\circ\text{C}$	---	---	1.2	V

<b>I<sub>s</sub></b>	Continuous Source Current <sup>2</sup>	---	---	---	12	A
<b>T<sub>rr</sub></b>	Body Diode Reverse Recovery Time	T <sub>J</sub> = 25°C, I <sub>F</sub> = 10A di/dt = 100A/μs <sup>(Note3)</sup>	---	29	---	Ns
<b>Q<sub>rr</sub></b>	Body Diode Reverse Recovery Charge		---	26	---	Nc

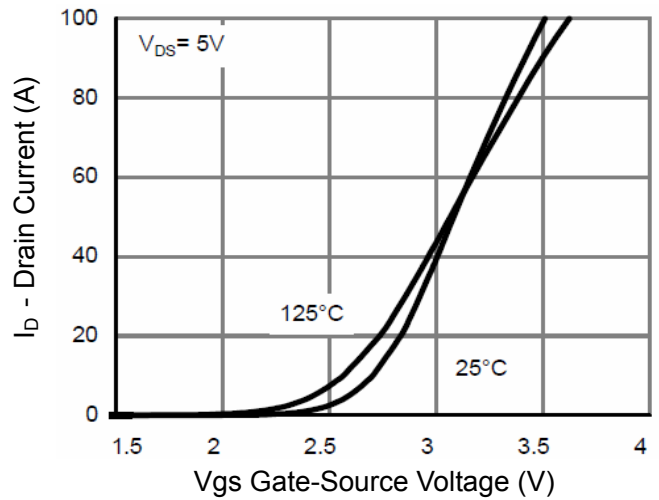
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

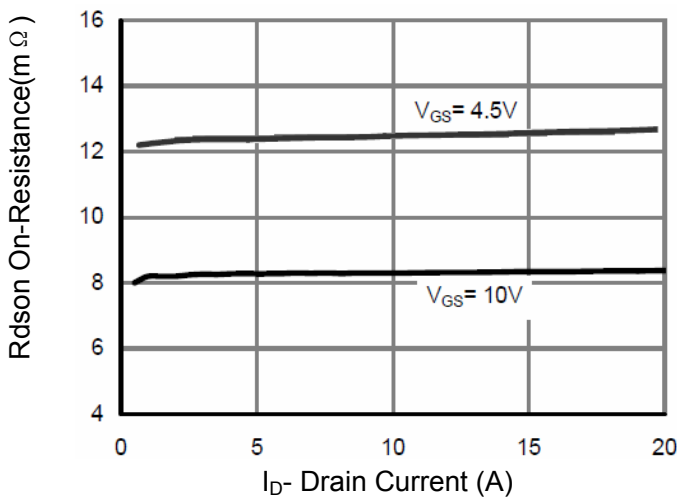
**Typical Characteristics:** (T<sub>c</sub>=25°C unless otherwise noted)



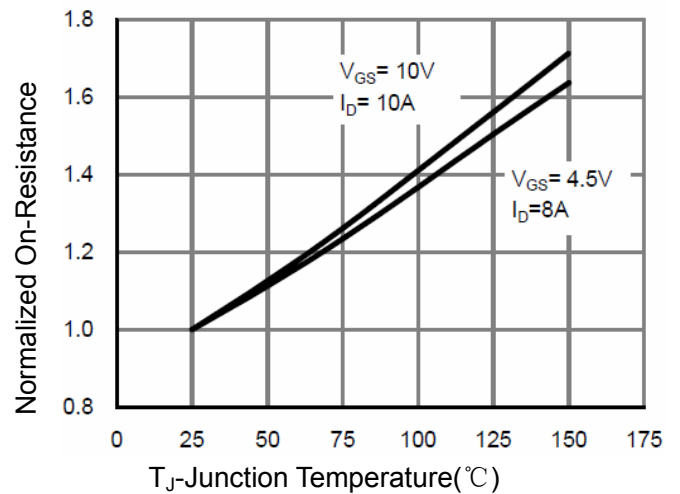
**Figure 1 Output Characteristics**



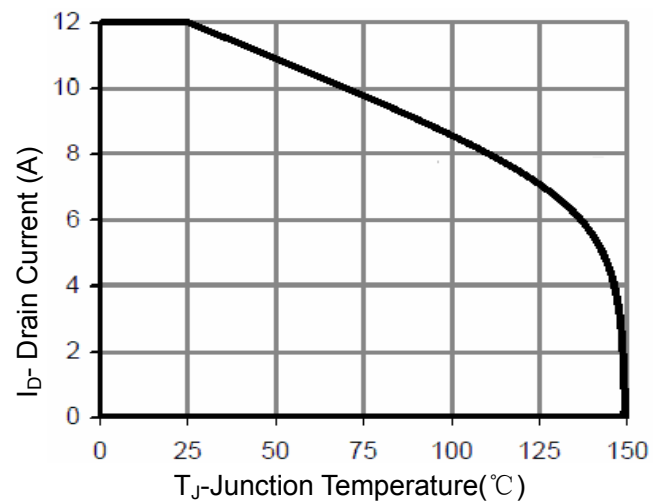
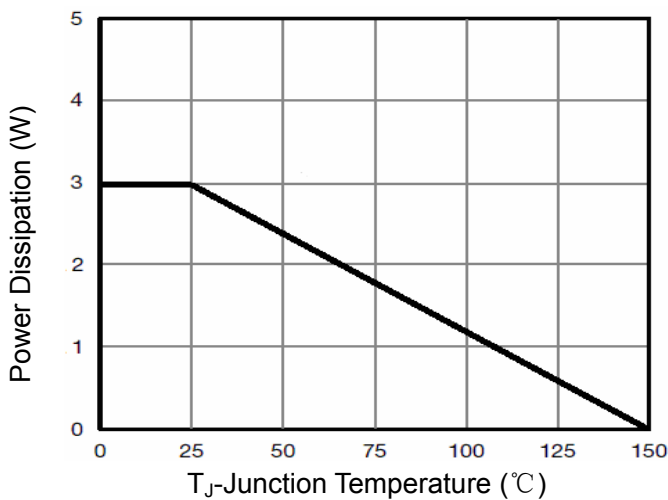
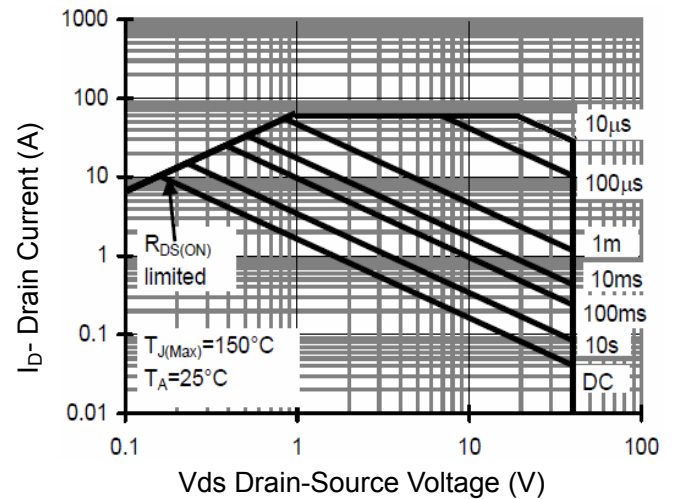
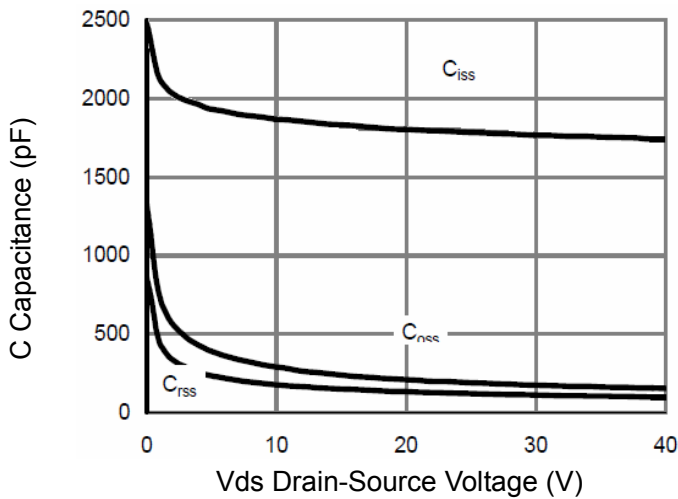
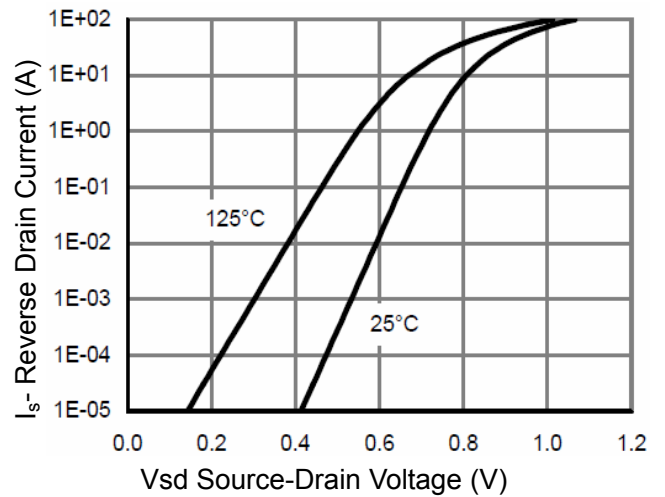
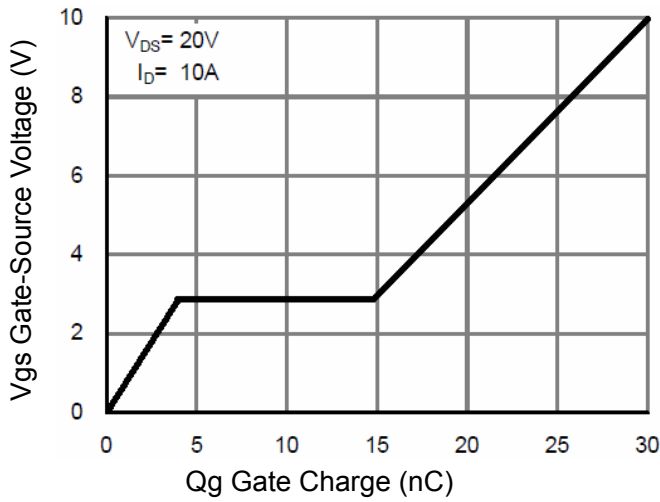
**Figure 2 Transfer Characteristics**

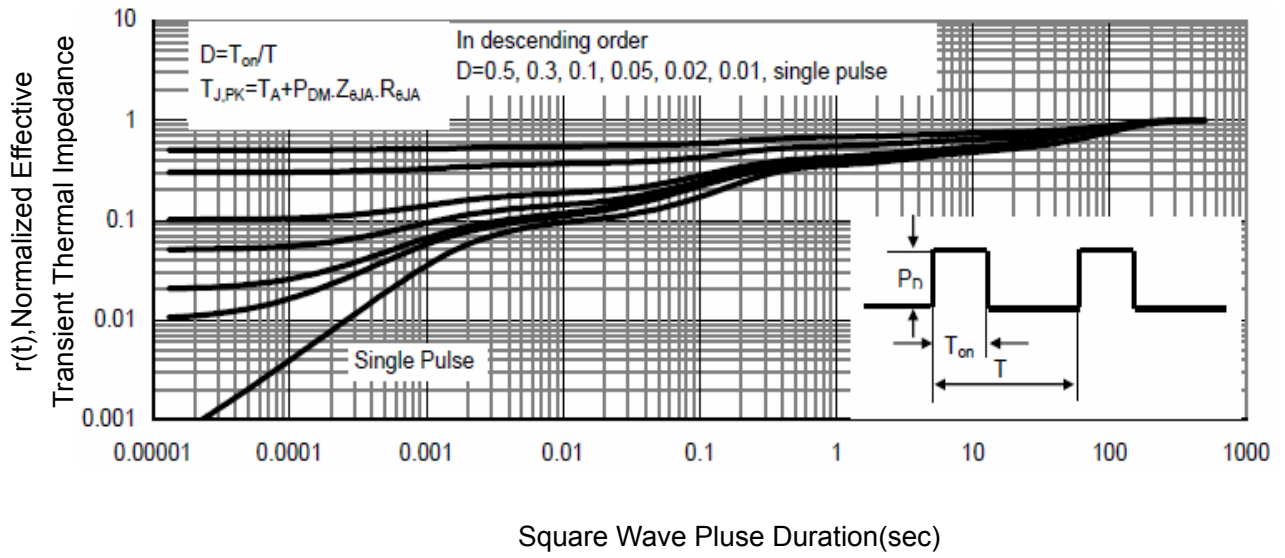


**Figure 3 Rdson- Drain Current**



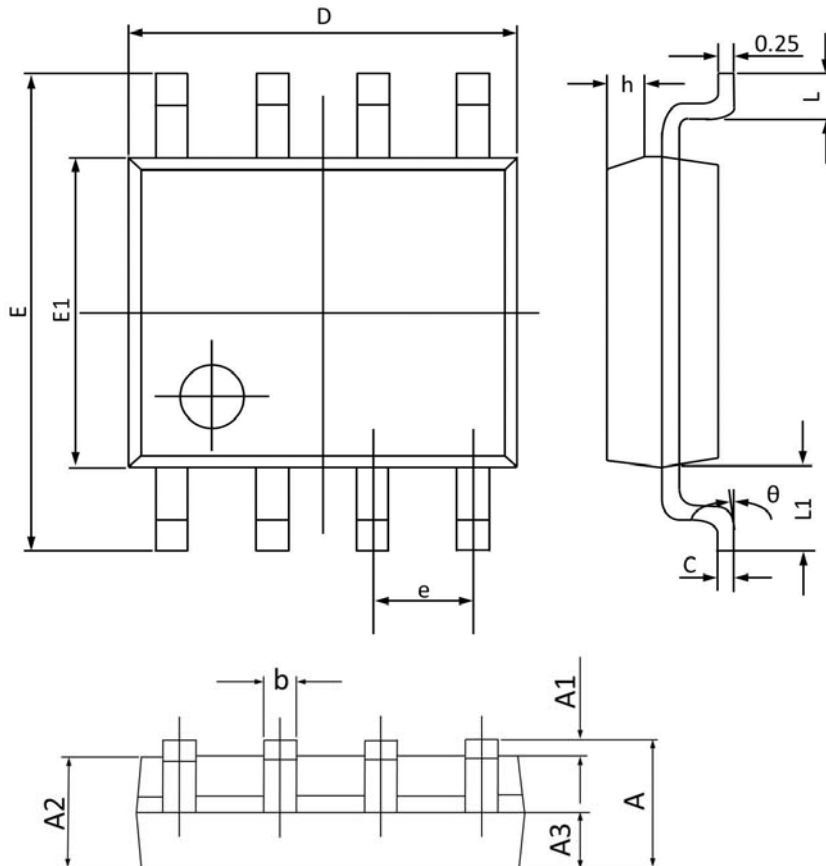
**Figure 4 Rdson-Junction Temperature**





**Figure 11 Normalized Maximum Transient Thermal Impedance**

## SOP8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
$\theta$	0°	8°	0°	8°

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