

## P-channel Enhancement Mode Power MOSFET

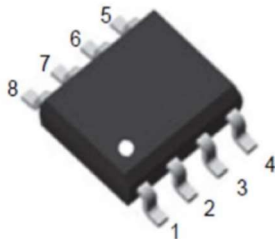
### Features

- $V_{DS} = -40V$ ,  $I_D = -13A$   
 $R_{DS(ON)} < 12m\Omega$  @  $V_{GS} = -10V$   
 $R_{DS(ON)} < 14m\Omega$  @  $V_{GS} = -4.5V$

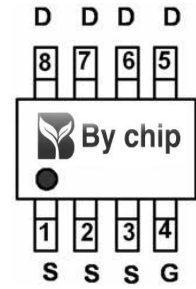
### General Features

- Advanced Trench Technology
- Provide Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free and Green Available

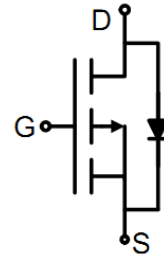
100% UIS TESTED!  
 100%  $\Delta V_{ds}$  TESTED!



SOP-8



pin assignment



Schematic diagram

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-13	A
Drain Current-Continuous( $T_C = 100^\circ C$ )	$I_D(100^\circ C)$	-9	A
Pulsed Drain Current	$I_{DM}$	50	A
Maximum Power Dissipation	$P_D$	2.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient(Note 2)	$R_{\theta JA}$	50	$^\circ C/W$
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**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

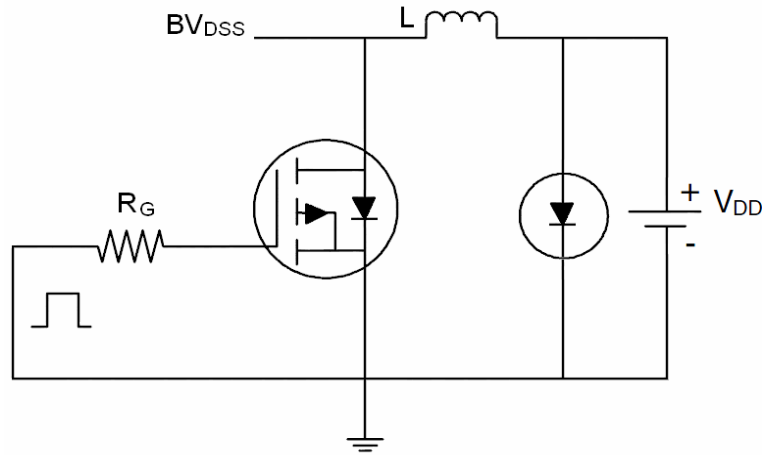
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-40V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0		-3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-12A$	-		12	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-15V, I_D=-10A$	35	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-20V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	2800	-	PF
Output Capacitance	$C_{oss}$		-	320	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	220	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-20V, R_L=2\Omega$ $V_{GS}=-10V, R_{GEN}=6\Omega$	-	11	-	nS
Turn-on Rise Time	$t_r$		-	75	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	89	-	nS
Turn-Off Fall Time	$t_f$		-	35	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-20V, I_D=-12A,$ $V_{GS}=-10V$	-	40	-	nC
Gate-Source Charge	$Q_{gs}$		-	6	-	nC
Gate-Drain Charge	$Q_{gd}$		-	12	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-12A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	-13	A

**Notes:**

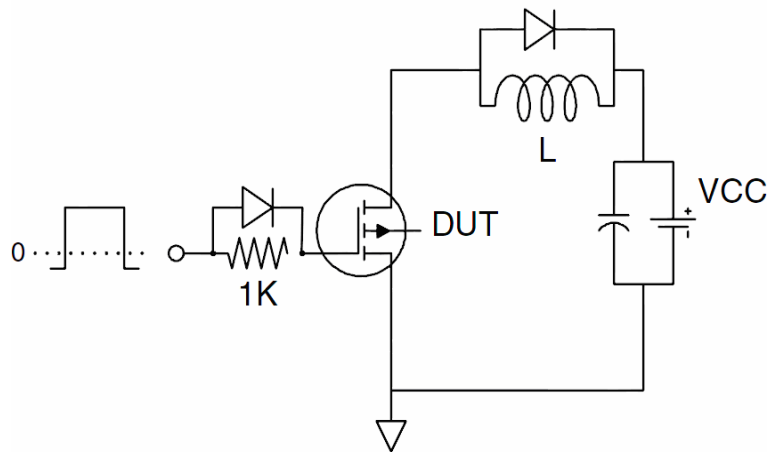
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

**Test Circuit**

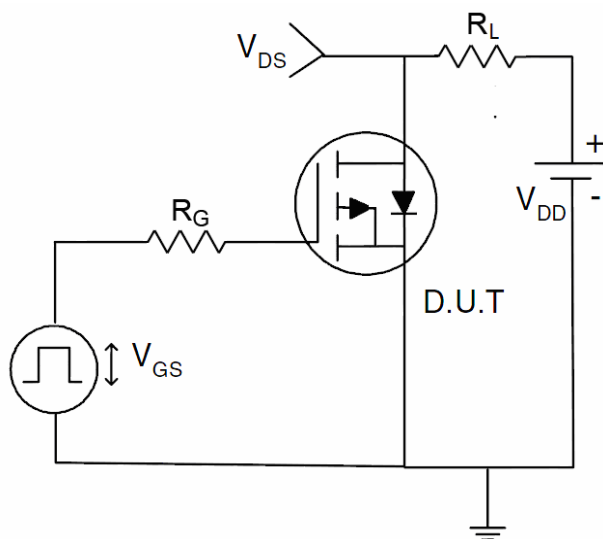
**1) E<sub>AS</sub> Test Circuit**



**2) Gate Charge Test Circuit**



**3) Switch Time Test Circuit**



Typical Electrical and Thermal Characteristics (Curves)

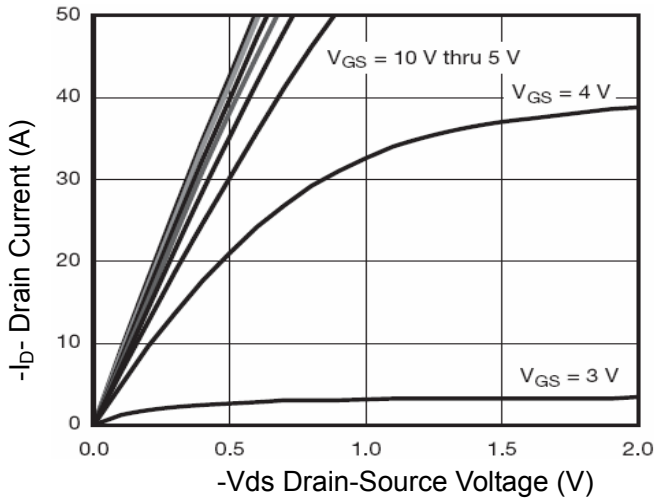


Figure 1 Output Characteristics

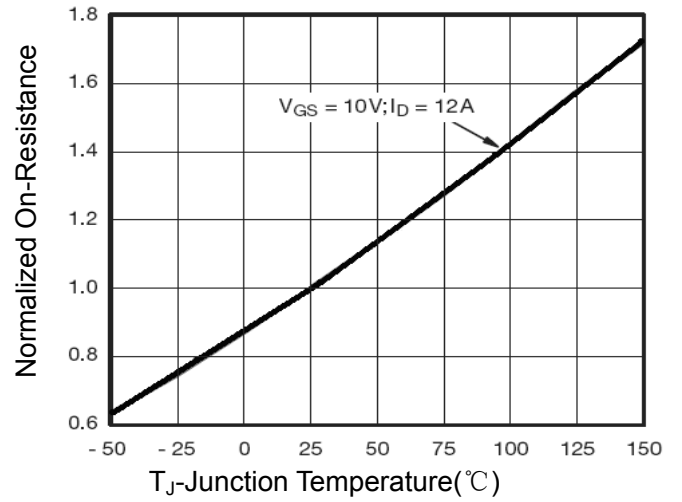


Figure 4 Rdson-Junction Temperature

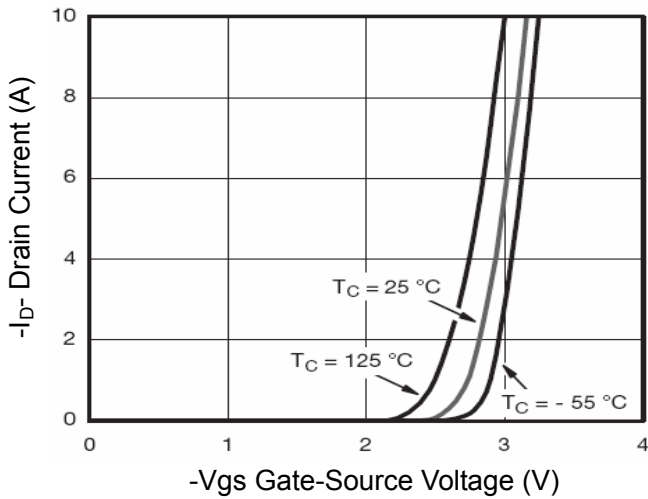


Figure 2 Transfer Characteristics

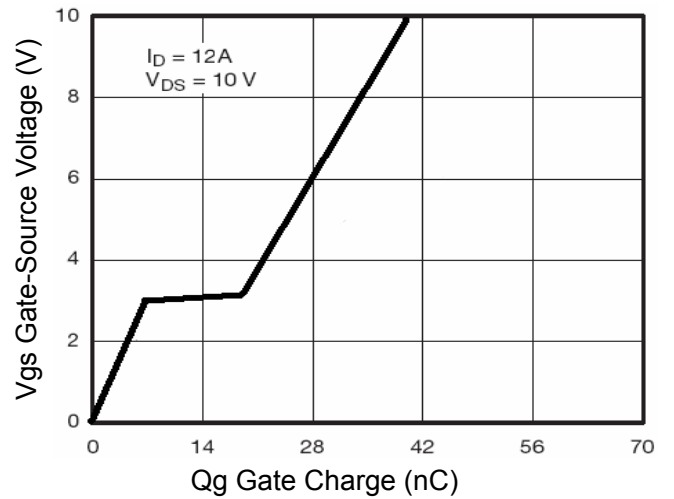


Figure 5 Gate Charge

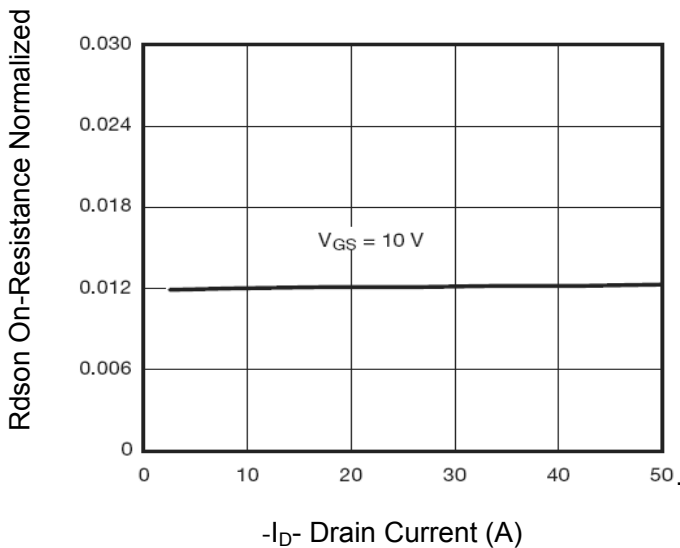


Figure 3 Rdson- Drain Current

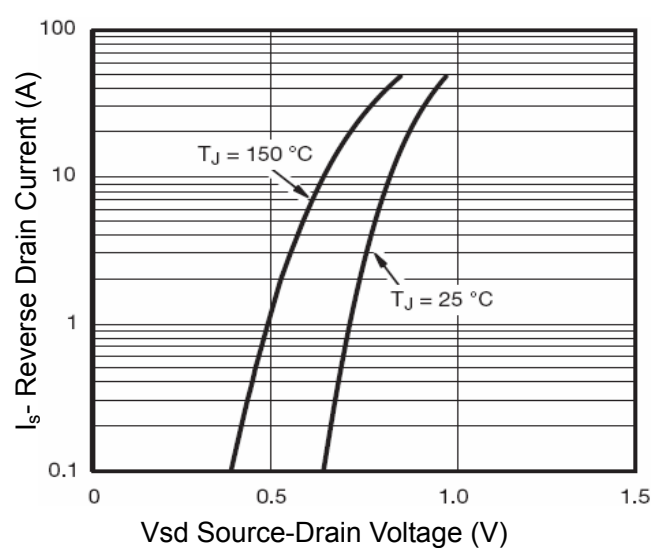


Figure 6 Source- Drain Diode Forward

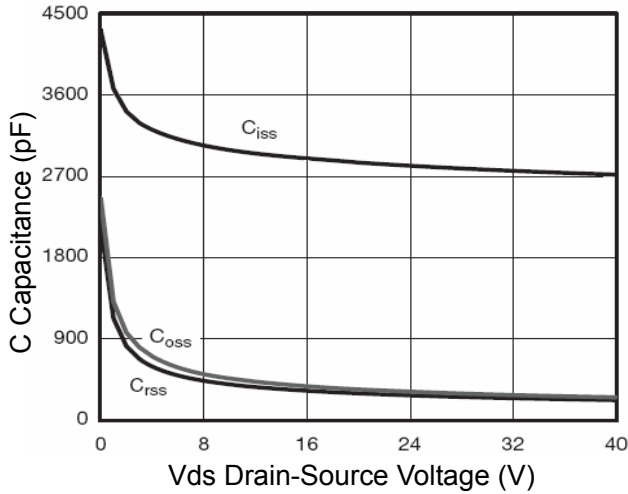


Figure 7 Capacitance vs Vds

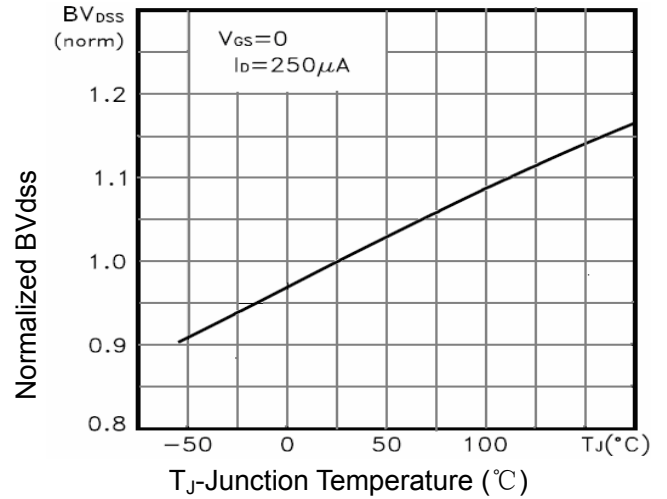


Figure 9  $BV_{DSS}$  vs Junction Temperature

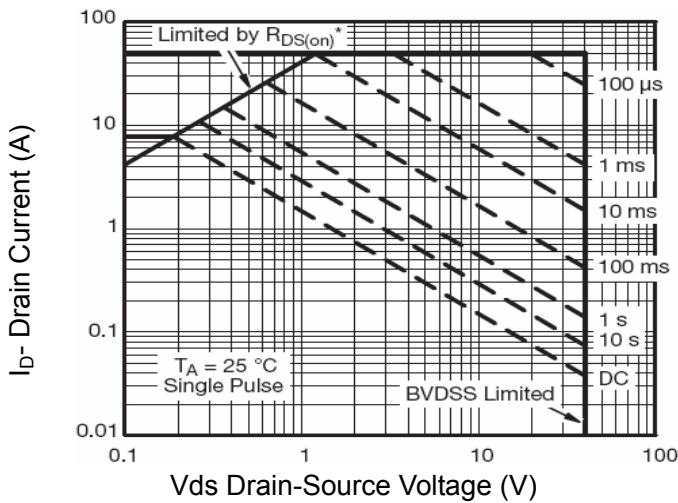


Figure 8 Safe Operation Area

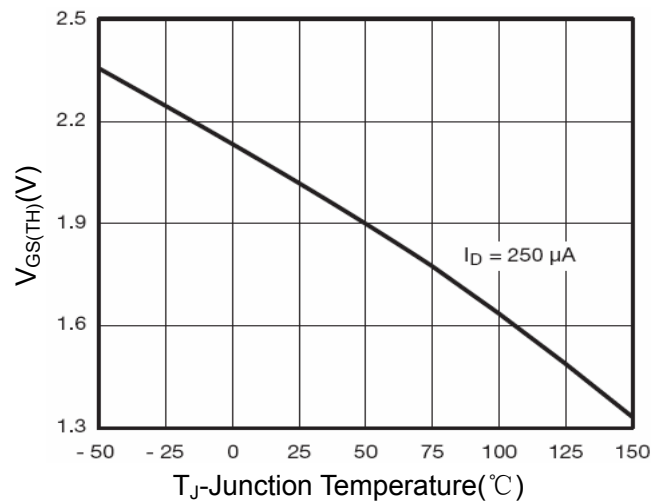


Figure 10  $V_{GS(th)}$  vs Junction Temperature

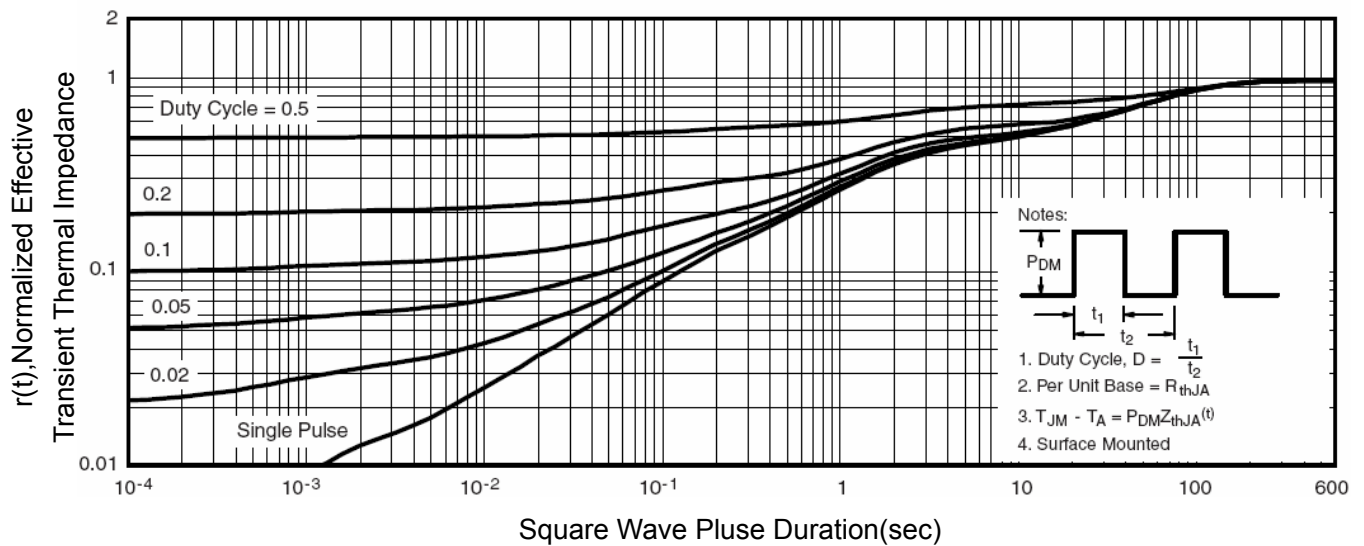


Figure 11 Normalized Maximum Transient Thermal Impedance