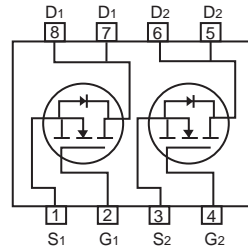
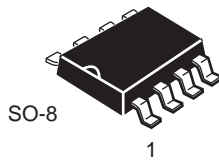


## Dual N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 20V, 9.5A,  $R_{DS(ON)} = 14m\Omega$  @  $V_{GS} = 4.5V$ .  
 $R_{DS(ON)} = 20m\Omega$  @  $V_{GS} = 2.5V$ .
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- Lead free product is acquired.
- Surface mount Package.



### ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	9.5	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}$	35	A
Maximum Power Dissipation	$P_D$	2.0	W
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Ambient <sup>b</sup>	$R_{\theta JA}$	62.5	$^\circ C/W$



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## Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$			1	$\mu A$
Gate Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS} = 12V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS} = -12V, V_{DS} = 0V$			-100	nA
<b>On Characteristics<sup>c</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	0.6		1.3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 10A$		11	14	$m\Omega$
		$V_{GS} = 2.5V, I_D = 8A$		14	20	$m\Omega$
<b>Dynamic Characteristics<sup>d</sup></b>						
Forward Transconductance	$g_{FS}$	$V_{DS} = 10V, I_D = 10A$		16		S
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0\text{ MHz}$		2800		pF
Output Capacitance	$C_{oss}$				520	pF
Reverse Transfer Capacitance	$C_{rss}$				380	pF
<b>Switching Characteristics<sup>d</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 10A, V_{GS} = 5V, R_{GEN} = 5.6\Omega$		17	35	ns
Turn-On Rise Time	$t_r$			16	33	ns
Turn-Off Delay Time	$t_{d(off)}$			68	140	ns
Turn-Off Fall Time	$t_f$			31	60	ns
Total Gate Charge	$Q_g$	$V_{DS} = 15V, I_D = 10A, V_{GS} = 5V$		31	40	nC
Gate-Source Charge	$Q_{gs}$			4.6		nC
Gate-Drain Charge	$Q_{gd}$			10		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Drain-Source Diode Forward Current <sup>b</sup>	$I_S$				2.3	A
Drain-Source Diode Forward Voltage <sup>c</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 2.3A$			1.2	V
<b>Notes :</b> a.Repetitive Rating : Pulse width limited by maximum junction temperature. b.Surface Mounted on FR4 Board, $t \leq 10$ sec. c.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ . d.Guaranteed by design, not subject to production testing.						



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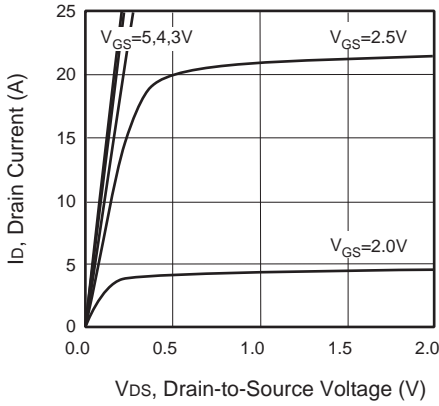


Figure 1. Output Characteristics

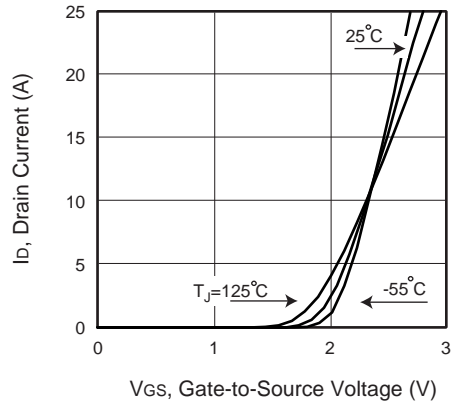


Figure 2. Transfer Characteristics

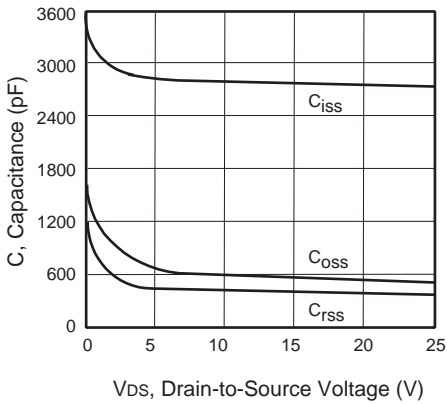


Figure 3. Capacitance

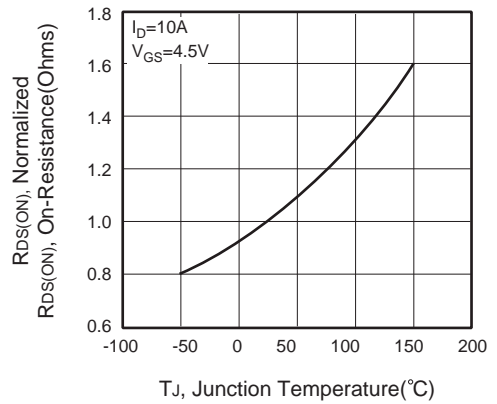


Figure 4. On-Resistance Variation with Temperature

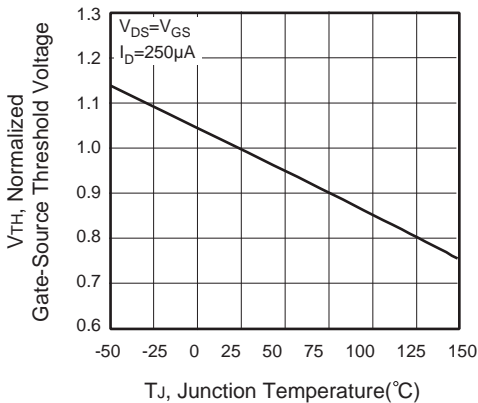


Figure 5. Gate Threshold Variation with Temperature

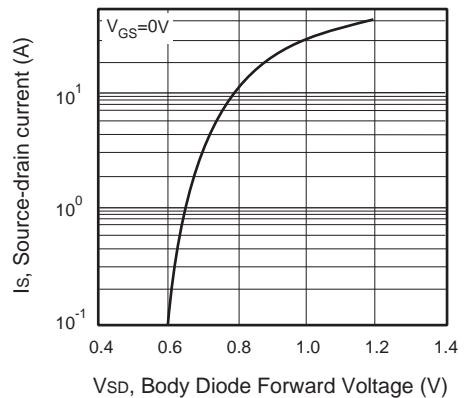


Figure 6. Body Diode Forward Voltage Variation with Source Current



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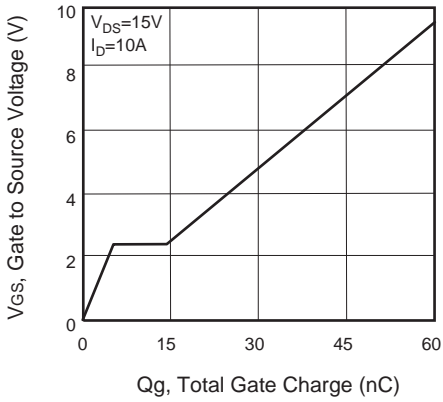


Figure 7. Gate Charge

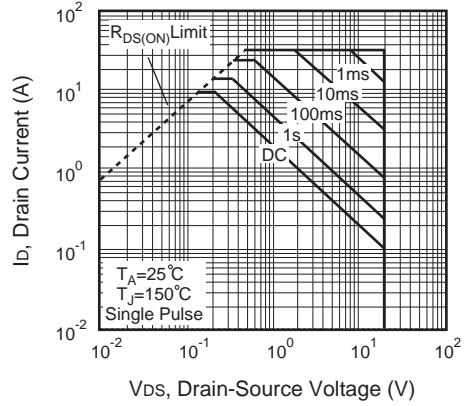


Figure 8. Maximum Safe Operating Area

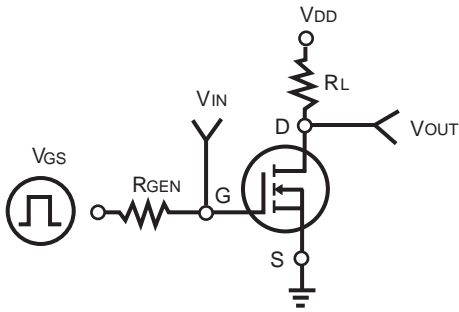


Figure 9. Switching Test Circuit

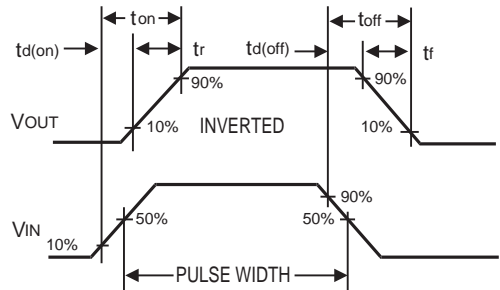


Figure 10. Switching Waveforms

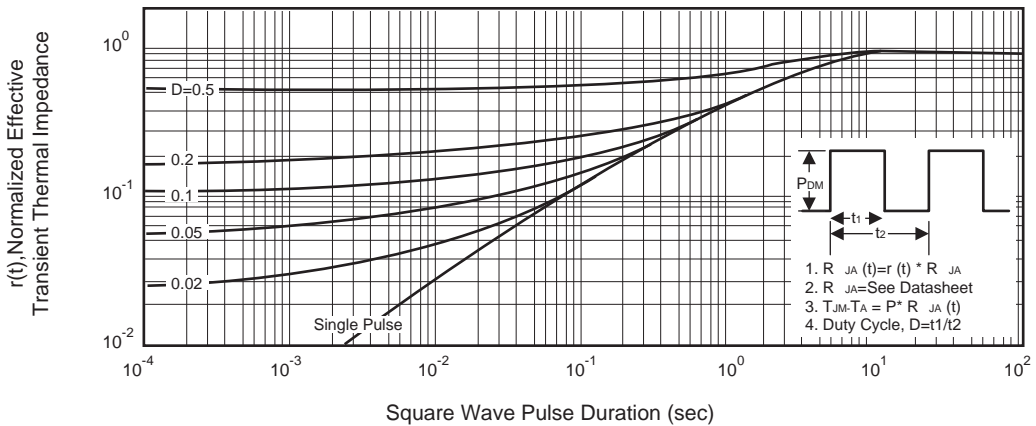


Figure 11. Normalized Thermal Transient Impedance Curve