

# CET3055

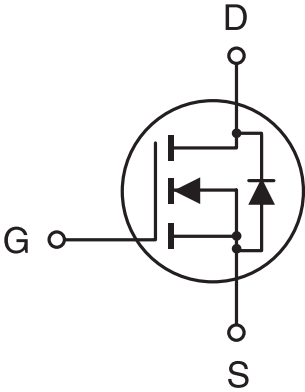


March 1998

## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 60V , 4A ,  $R_{DS(ON)}=100m\Omega$  @  $V_{GS}=10V$ .
- High dense cell design for low  $R_{DS(ON)}$ .
- Rugged and reliable.
- SOT-223 Package.



SOT-223



SOT-223 (J23Z)

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### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous <sup>a</sup> @ $T_J=125^{\circ}C$ -Pulsed <sup>b</sup>	$I_D$	$\pm 4$	A
	$I_{DM}$	$\pm 25$	A
Drain-Source Diode Forward Current <sup>a</sup>	$I_S$	2.5	A
Maximum Power Dissipation <sup>a</sup>	PD	3	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-65 to 150	$^{\circ}C$

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient <sup>a</sup>	$R_{\theta JA}$	42	$^{\circ}C/W$
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## ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	60			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V			10	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100	nA
<b>ON CHARACTERISTICS<sup>b</sup></b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2	2.7	4	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A		75	100	mΩ
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 10V	15			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4A	3	4		S
<b>DYNAMIC CHARACTERISTICS<sup>c</sup></b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1.0MHz		292	400	pF
Output Capacitance	C <sub>OSS</sub>			130	200	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			36	50	pF
<b>SWITCHING CHARACTERISTICS<sup>c</sup></b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> = 25V, I <sub>D</sub> = 1.2A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = 50Ω		17	25	ns
Rise Time	t <sub>r</sub>			24	50	ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			41	65	ns
Fall time	t <sub>f</sub>			33	60	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 40V, I <sub>D</sub> = 4A, V <sub>GS</sub> = 10V		9	17	nC
Gate-Source Charge	Q <sub>gs</sub>			3		nC
Gate-Drain Charge	Q <sub>gd</sub>			3		nC

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## ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>DRAIN-SOURCE DIODE CHARACTERISTICS<sup>b</sup></b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{V}, I_S = 4\text{A}$			1.2	V

### Notes

- a. Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$ .
- b. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
- c. Guaranteed by design, not subject to production testing.

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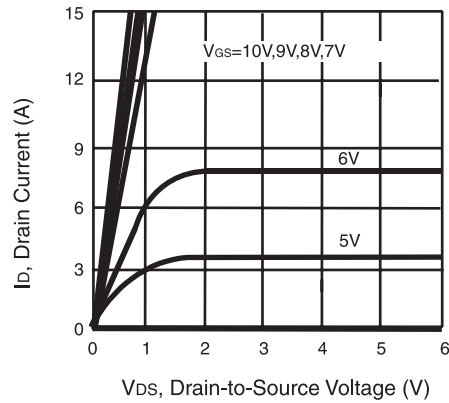


Figure 1. Output Characteristics

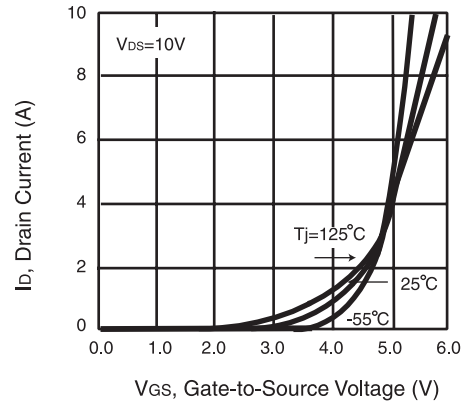


Figure 2. Transfer Characteristics

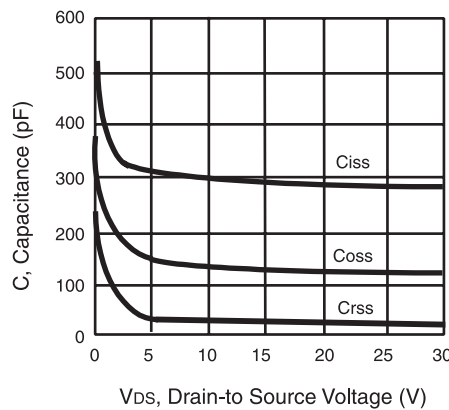


Figure 3. Capacitance

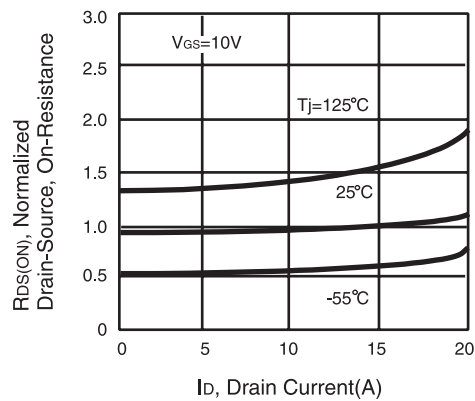
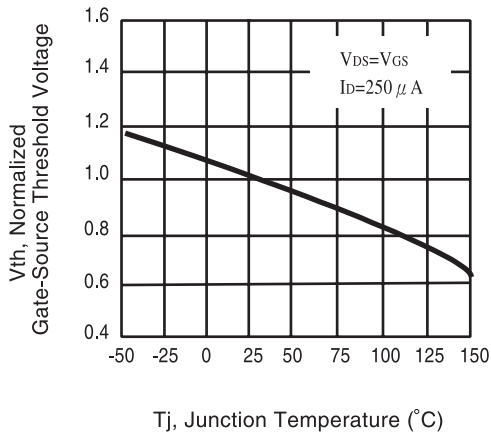
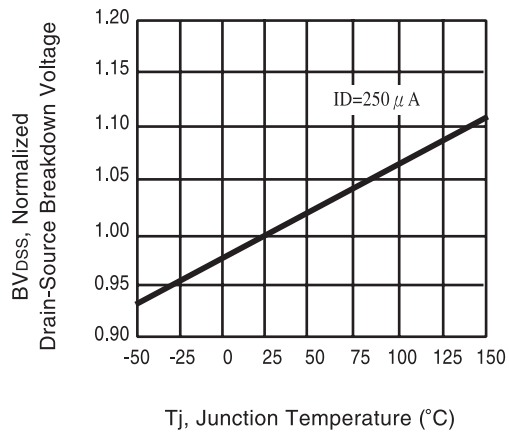


Figure 4. On-Resistance Variation with Drain Current and Temperature

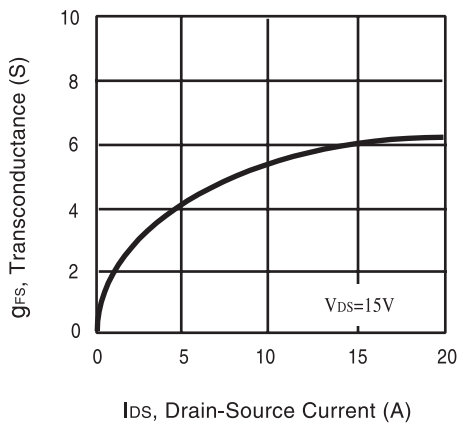
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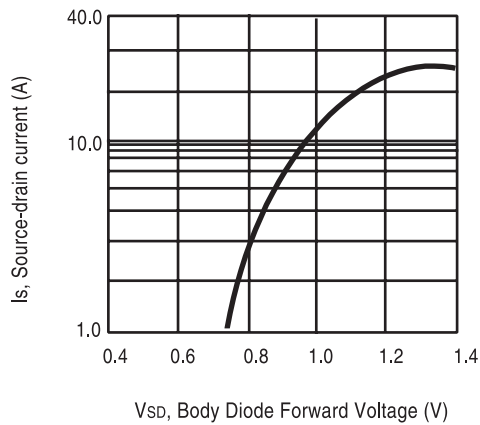
**Figure 5. Gate Threshold Variation with Temperature**



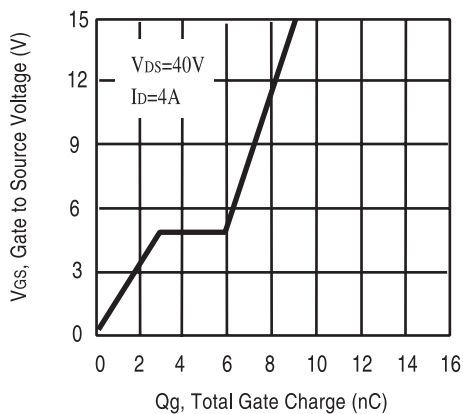
**Figure 6. Breakdown Voltage Variation with Temperature**



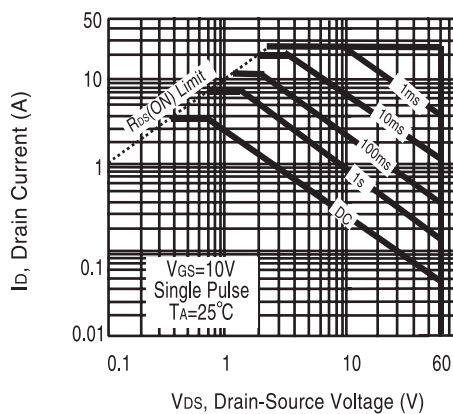
**Figure 7. Transconductance Variation with Drain Current**



**Figure 8. Body Diode Forward Voltage Variation with Source Current**



**Figure 9. Gate Charge**



**Figure 10. Maximum Safe Operating Area**

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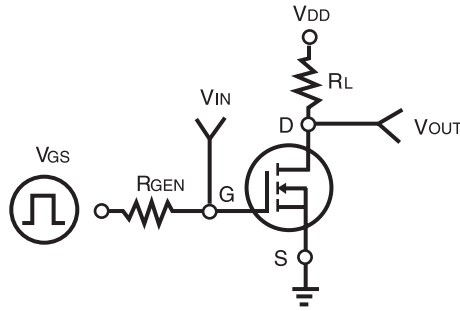


Figure 11. Switching Test Circuit

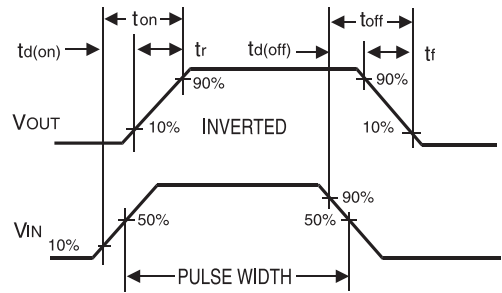


Figure 12. Switching Waveforms

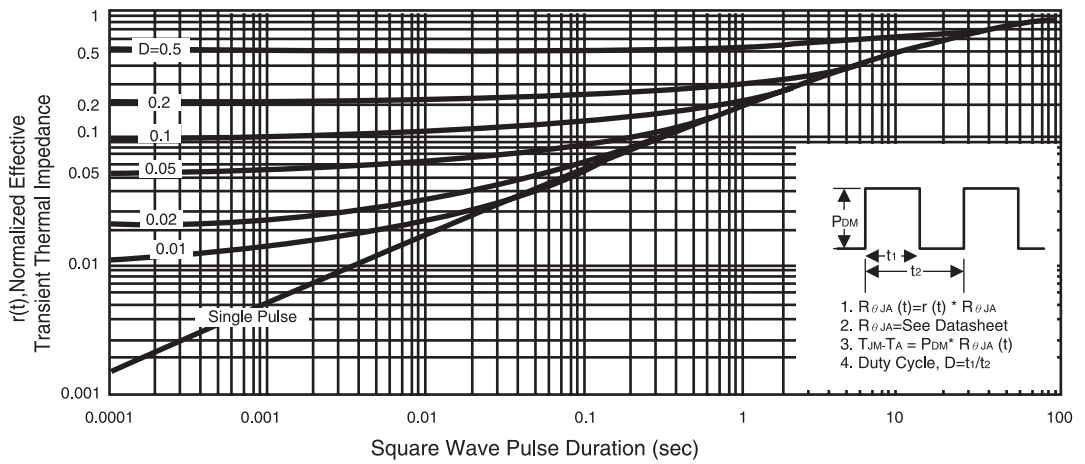


Figure 13. Normalized Thermal Transient Impedance Curve