

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	20			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, Referenced to 25°C		12		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			1	μA
I_{GSS}	Gate–Body Leakage	$V_{GS} = \pm 12\text{ V}, V_{DS} = 0\text{ V}$			± 100	nA

On Characteristics (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.4	0.9	1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, Referenced to 25°C		-3.2		mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = 4.5\text{ V}, I_D = 6.0\text{ A}$ $V_{GS} = 2.5\text{ V}, I_D = 5.0\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 6.0\text{ A}, T_J = 125^\circ\text{C}$		15.5 19.6 20	18 28 29	m Ω
$I_{D(on)}$	On–State Drain Current	$V_{GS} = 4.5\text{ V}, V_{DS} = 5\text{ V}$	30			A
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 6.0\text{ A}$		32		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		1290		pF
C_{oss}	Output Capacitance			315		pF
C_{rss}	Reverse Transfer Capacitance			170		pF
R_G	Gate Resistance	$V_{GS} = 15\text{ mV}, f = 1.0\text{ MHz}$		2.0		Ω

Switching Characteristics (Note 2)

$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = 10\text{ V}, I_D = 1\text{ A},$ $V_{GS} = 4.5\text{ V}, R_{GEN} = 6\text{ }\Omega$		10	18	ns
t_r	Turn–On Rise Time			15	27	ns
$t_{d(off)}$	Turn–Off Delay Time			26	47	ns
t_f	Turn–Off Fall Time			9.5	19	ns
Q_g	Total Gate Charge	$V_{DS} = 10\text{ V}, I_D = 6.0\text{ A},$ $V_{GS} = 4.5\text{ V}$		12	17	nC
Q_{gs}	Gate–Source Charge			2.4		nC
Q_{gd}	Gate–Drain Charge			3.3		nC

Drain–Source Diode Characteristics and Maximum Ratings

t_{rr}	Diode Reverse Recovery Time	$I_F = 6.0\text{ A},$ $dI_F/dt = 100\text{ A}/\mu\text{s}$		20		nS
Q_{rr}	Diode Reverse Recovery Charge			6.7		nC
I_S	Maximum Continuous Drain–Source Diode Forward Current				0.83	A
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 0.83\text{ A}$ (Note 2)		0.7	1.2	V

Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.

- a) $R_{\theta JA}$ is 125°C/W (steady state) when mounted on a 1 inch² copper pad on FR-4.
b) $R_{\theta JA}$ is 208°C/W (steady state) when mounted on a minimum copper pad on FR-4.

2. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%

Typical Characteristics

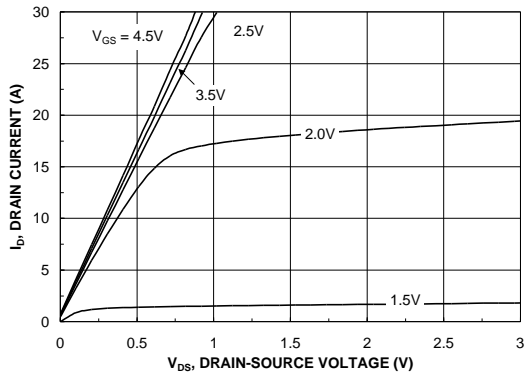


Figure 1. On-Region Characteristics.

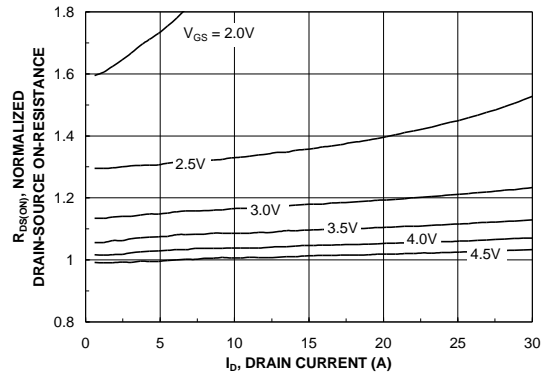


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

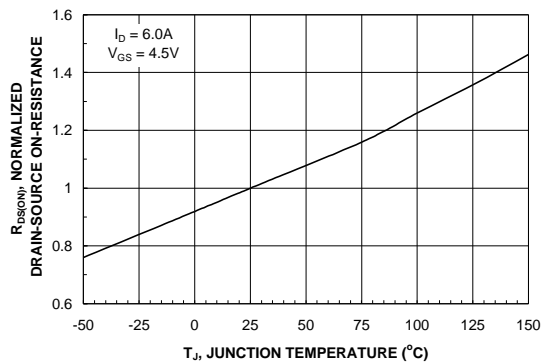


Figure 3. On-Resistance Variation with Temperature.

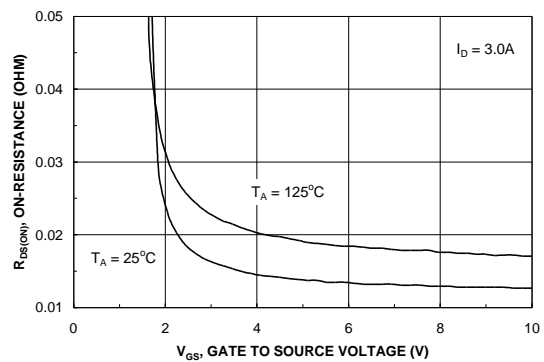


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

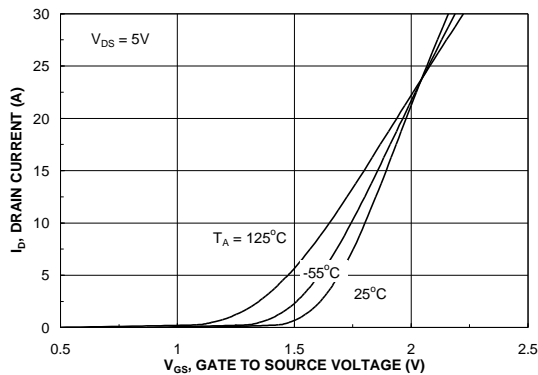


Figure 5. Transfer Characteristics.

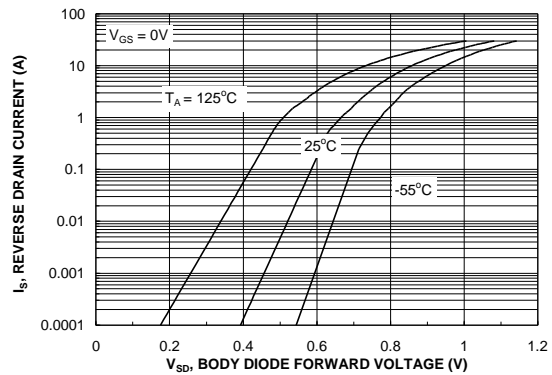


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

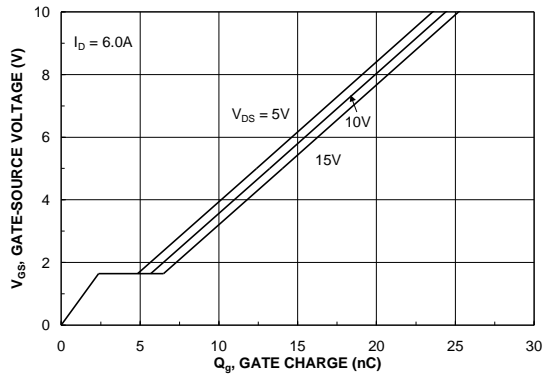


Figure 7. Gate Charge Characteristics.

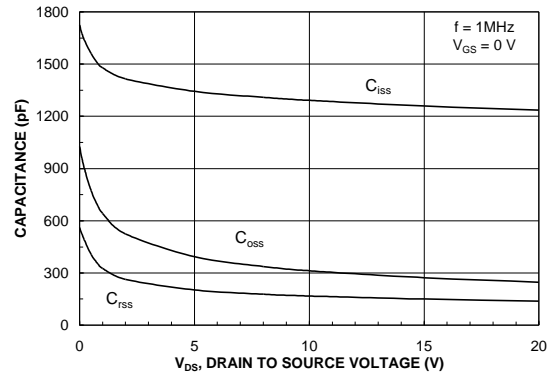


Figure 8. Capacitance Characteristics.

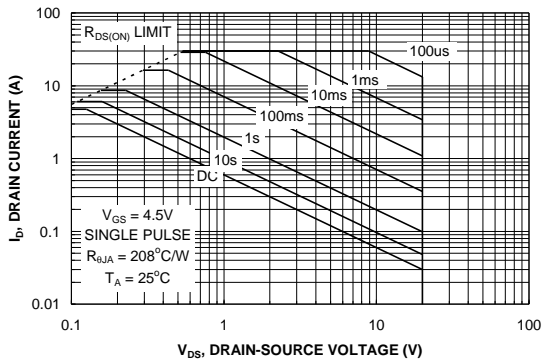


Figure 9. Maximum Safe Operating Area.

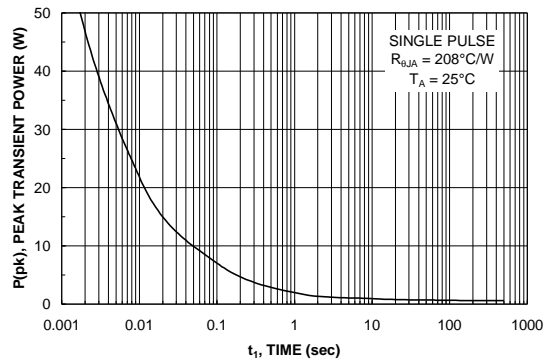


Figure 10. Single Pulse Maximum Power Dissipation.

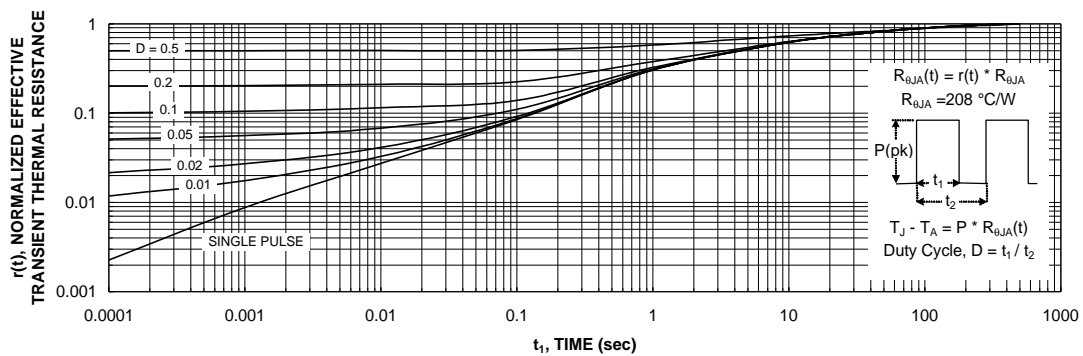


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1b.
Transient thermal response will change depending on the circuit board design.



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