

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	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C		39		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$			1	μA
I_{GSS}	Gate–Body Leakage	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			± 100	nA

On Characteristics (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1	1.4	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C		-5		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = 10\text{ V}, I_D = 21\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 18\text{ A}$ $V_{GS} = 10\text{ V}, I_D = 21\text{ A}, T_J = 125^\circ\text{C}$		3.3 4.2 4.4	3.7 5.0 5.5	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 21\text{ A}$		118		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V},$		4040		pF
C_{oss}	Output Capacitance	$f = 1.0\text{ MHz}$		1730		pF
C_{rss}	Reverse Transfer Capacitance			160		pF
R_G	Gate Resistance	$f = 1.0\text{ MHz}$	0.2	0.9	1.5	Ω

Switching Characteristics (Note 2)

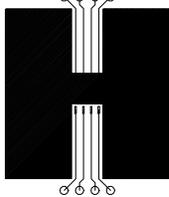
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = 15\text{ V}, I_D = 1\text{ A},$		12	21	ns
t_r	Turn–On Rise Time	$V_{GS} = 10\text{ V}, R_{GEN} = 6\ \Omega$		11	20	ns
$t_{d(off)}$	Turn–Off Delay Time			56	90	ns
t_f	Turn–Off Fall Time			68	108	ns
$Q_{g(TOT)}$	Total Gate Charge at $V_{GS} = 10\text{ V}$	$V_{DD} = 15\text{ V}, I_D = 21\text{ A}$		58.5	82	nC
$Q_{g(TOT)}$	Total Gate Charge at $V_{GS} = 5\text{ V}$			30	42	nC
Q_{gs}	Gate–Source Charge			9.5		nC
Q_{gd}	Gate–Drain Charge			5.5		nC

Drain–Source Diode Characteristics and Maximum Ratings

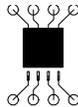
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 2.1\text{ A}$ (Note 2)		0.7	1.2	V
t_{rr}	Diode Reverse Recovery Time	$I_F = 21\text{ A},$		51		ns
I_{RM}	Diode Reverse Recovery Current	$di_F/dt = 100\text{ A}/\mu\text{s}$		1.5		A
Q_{rr}	Diode Reverse Recovery Charge			37		nC

Notes:

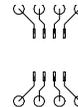
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 50°W when mounted on a 1 in^2 pad of 2 oz copper



b) 105°W when mounted on a $.04\text{ in}^2$ pad of 2 oz copper



c) 125°W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < $300\ \mu\text{s}$, Duty Cycle < 2.0%

3. Starting $T_J = 25^\circ\text{C}$, $L = 3\text{ mH}$, $I_{AS} = 17\text{ A}$, $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$

Typical Characteristics

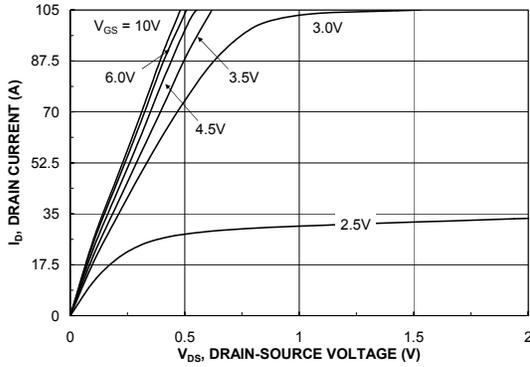


Figure 1. On-Region Characteristics.

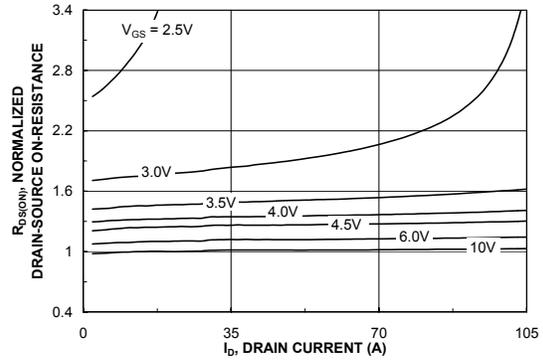


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

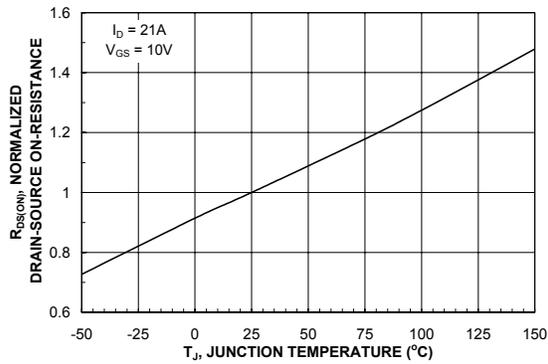


Figure 3. On-Resistance Variation with Temperature.

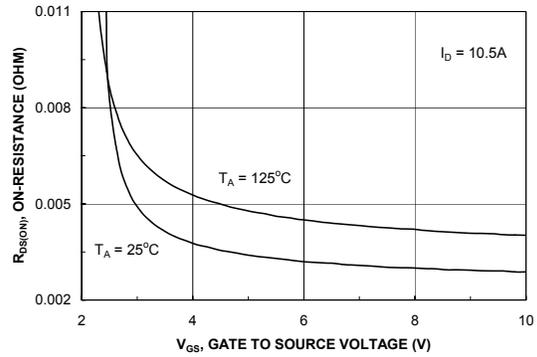


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

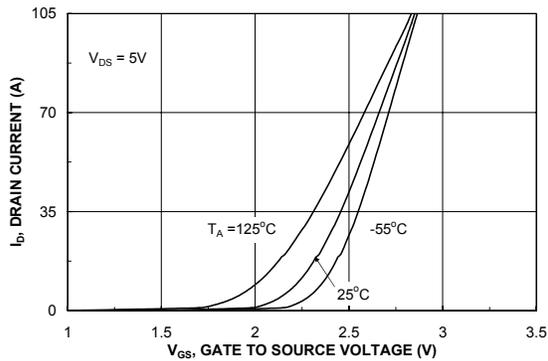


Figure 5. Transfer Characteristics.

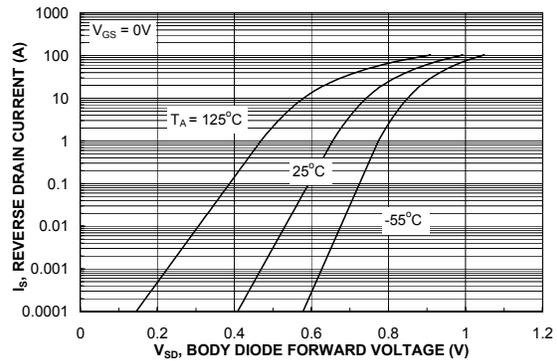


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics (continued)

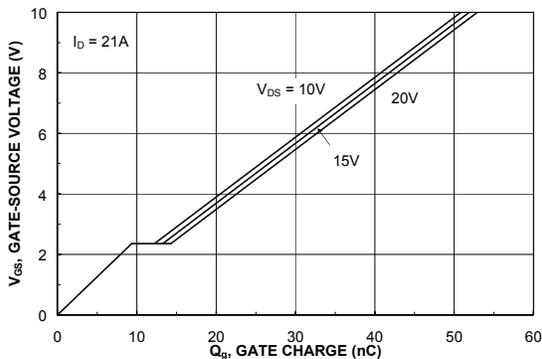


Figure 7. Gate Charge Characteristics.

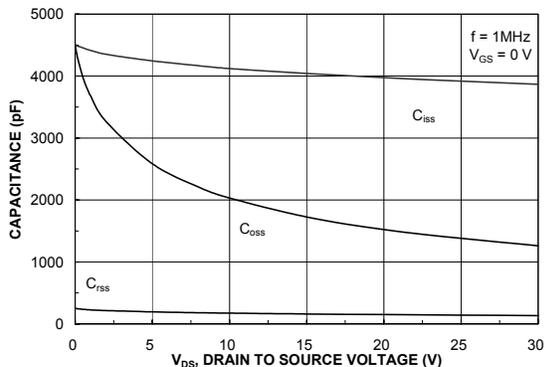


Figure 8. Capacitance Characteristics.

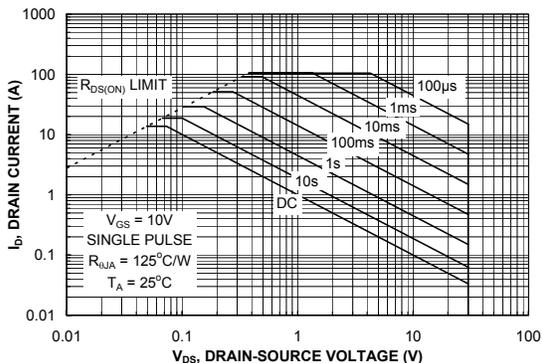


Figure 9. Maximum Safe Operating Area.

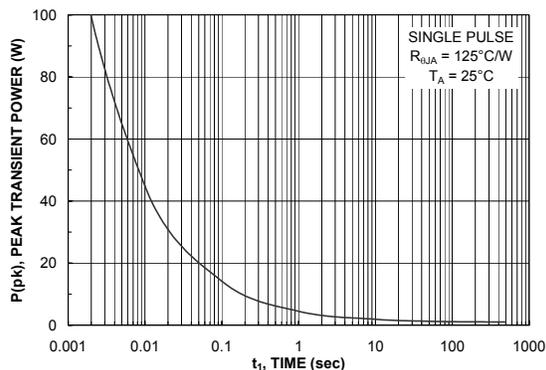


Figure 10. Single Pulse Maximum Power Dissipation.

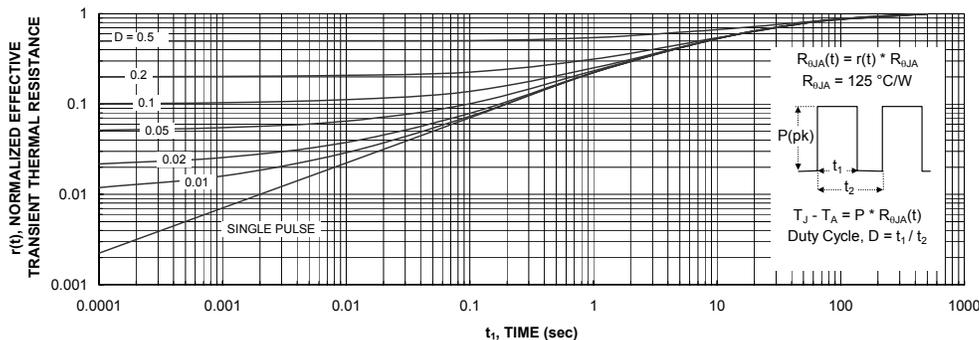


Figure 11. Transient Thermal Response Curve.

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



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