

EM6M2T2R-VB Datasheet

N-and P-Channel 20V (D-S) MOSFET

PRODUCT SUMMARY

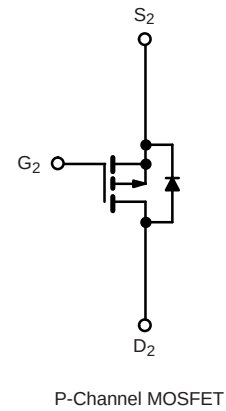
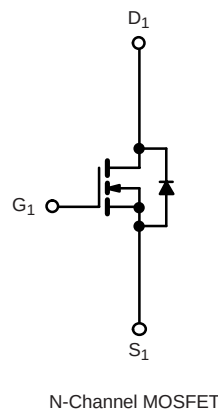
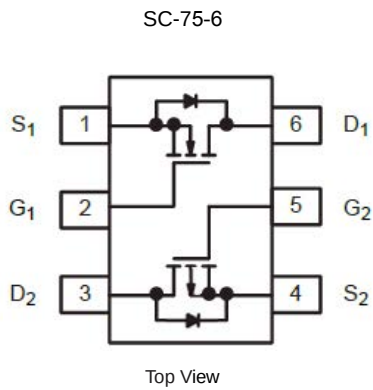
	V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
N-Channel	20	0.270 at $V_{GS} = 4.5$ V	0.60
		0.410 at $V_{GS} = 2.5$ V	0.55
P-Channel	- 20	0.660 at $V_{GS} = - 4.5$ V	- 0.30
		0.840 at $V_{GS} = - 2.5$ V	- 0.25

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Trench Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available



ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V _{DS}	20	- 20	V
Gate-Source Voltage		V _{GS}	± 20	± 20	
Continuous Drain Current (T _J = 150 °C) ^{a, b}	T _A = 25 °C	I _D	0.6	- 0.3	A
	T _A = 70 °C		0.55	- 0.25	
Pulsed Drain Current		I _{DM}	3	- 2	
Continuous Source Current (Diode Conduction) ^{a, b}		I _S	1.05	- 1.05	
Maximum Power Dissipation ^{a, b}	T _A = 25 °C	P _D	1.15		W
	T _A = 70 °C		0.73		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	93	110	$^\circ\text{C/W}$
		130	150	
Maximum Junction-to-Lead	R_{thJL}	75	90	

Notes:

a. Surface Mounted on FR4 board.

b. $t \leq 5$ s.

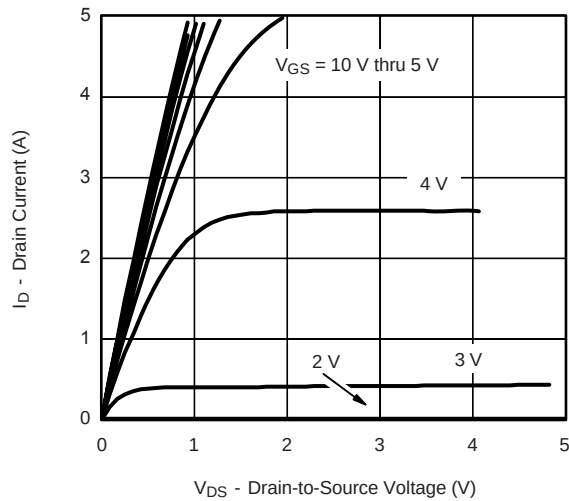
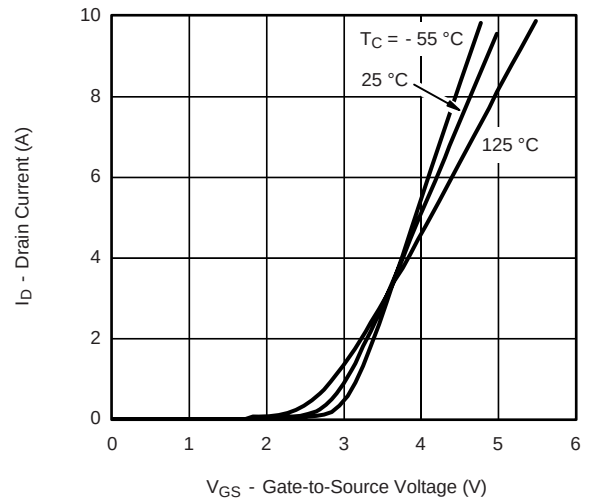
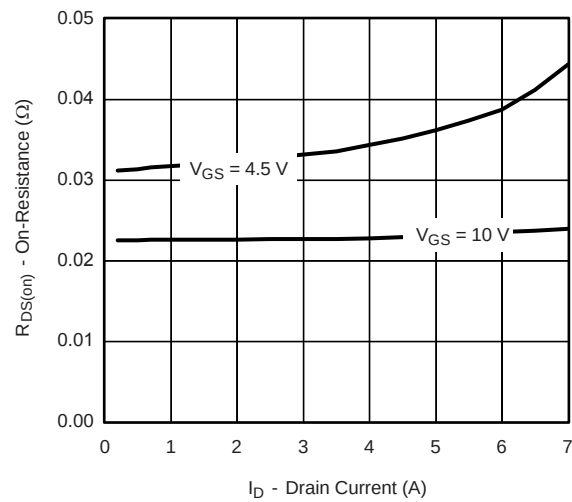
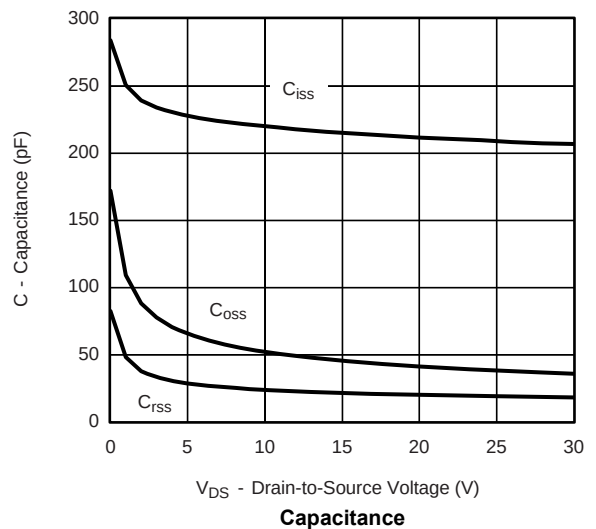
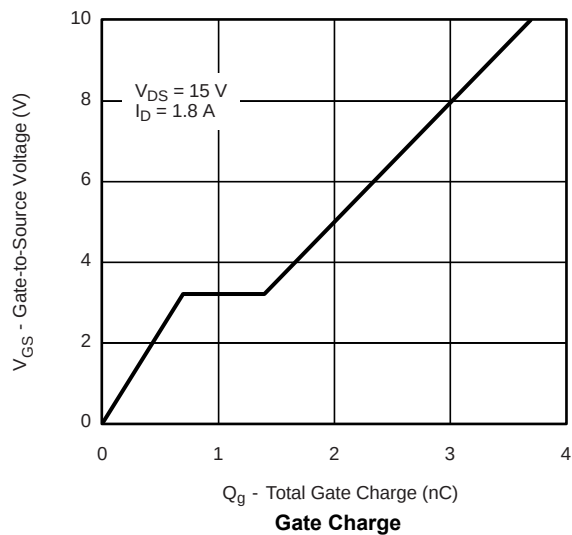
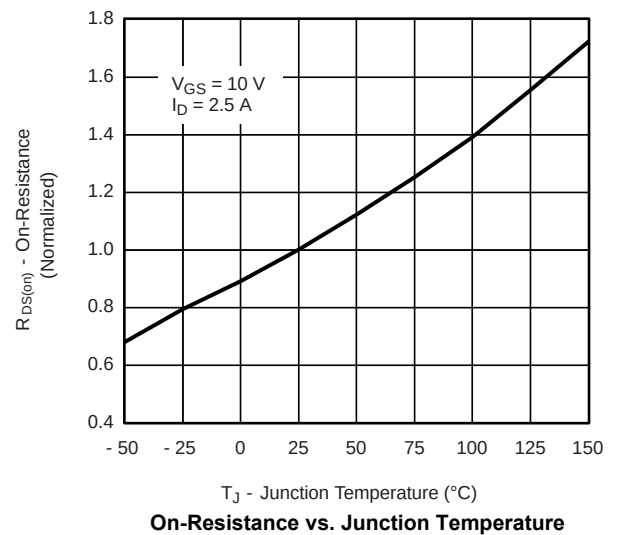
SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Static							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	N-Ch	0.7			V
		$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	P-Ch	- 0.8			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	N-Ch P-Ch			± 100 ± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$	N-Ch			1	μA
		$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$	P-Ch			- 1	
		$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^{\circ}\text{C}$	N-Ch			5	
		$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^{\circ}\text{C}$	P-Ch			- 5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	N-Ch	3.7			A
		$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	P-Ch	- 3			
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 2.5\text{ V}, I_D = 0.6\text{ A}$	N-Ch		0.410		Ω
		$V_{GS} = -2.5\text{ V}, I_D = -0.3\text{ A}$	P-Ch		0.840		
		$V_{GS} = 4.5\text{ V}, I_D = 0.6\text{ A}$	N-Ch		0.270		
		$V_{GS} = -4.5\text{ V}, I_D = -0.3\text{ A}$	P-Ch		0.660		
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 2.5\text{ A}$	N-Ch		4.3		S
		$V_{DS} = -15\text{ V}, I_D = -1.8\text{ A}$	P-Ch		2.4		
Diode Forward Voltage ^a	V_{SD}	$I_S = 1.05\text{ A}, V_{GS} = 0\text{ V}$	N-Ch		0.81	1.10	V
		$I_S = -1.05\text{ A}, V_{GS} = 0\text{ V}$	P-Ch		- 0.83	- 1.10	
Dynamic ^b							
Total Gate Charge	Q_g	N-Channel $V_{DS} = 15\text{ V}, V_{GS} = 5\text{ V}, I_D = 1.8\text{ A}$	N-Ch P-Ch		2.1 2.4	3.2 3.6	nC
Gate-Source Charge	Q_{gs}		N-Ch P-Ch		0.7 0.9		
Gate-Drain Charge	Q_{gd}	P-Channel $V_{DS} = -15\text{ V}, V_{GS} = -5\text{ V}, I_D = -1.8\text{ A}$	N-Ch P-Ch		0.7 0.8		
Gate Resistance	R_g		N-Ch P-Ch	0.5 3		2.4 11	Ω
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$	N-Ch P-Ch		7 8	11 12	ns
Rise Time	t_r		N-Ch P-Ch		9 12	14 18	
Turn-Off Delay Time	$t_{d(off)}$	P-Channel $V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6\text{ }\Omega$	N-Ch P-Ch		13 12	20 18	
Fall Time	t_f		N-Ch P-Ch		5 7	8 11	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.05\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$	N-Ch		35	60	
		$I_F = -1.05\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$	P-Ch		30	60	

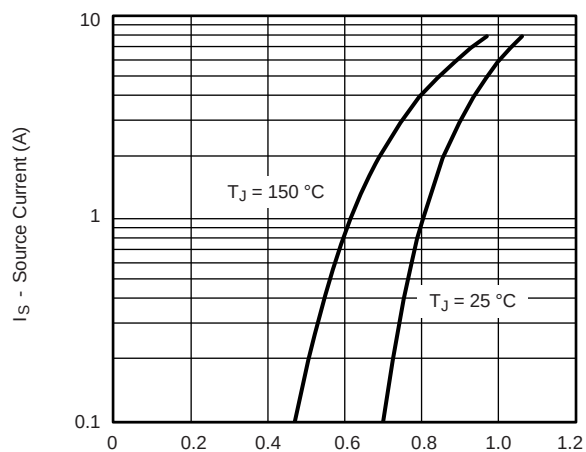
Notes:

a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

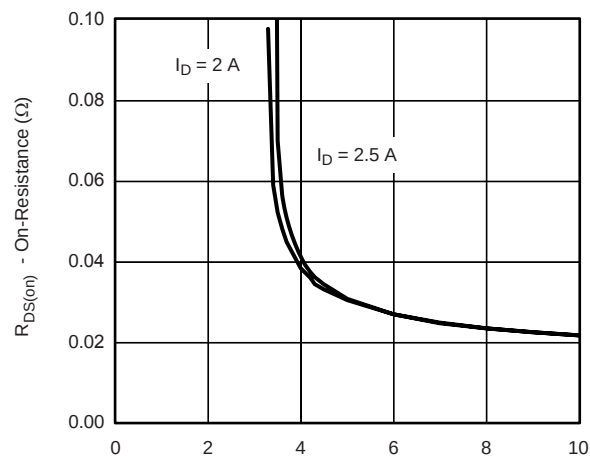
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

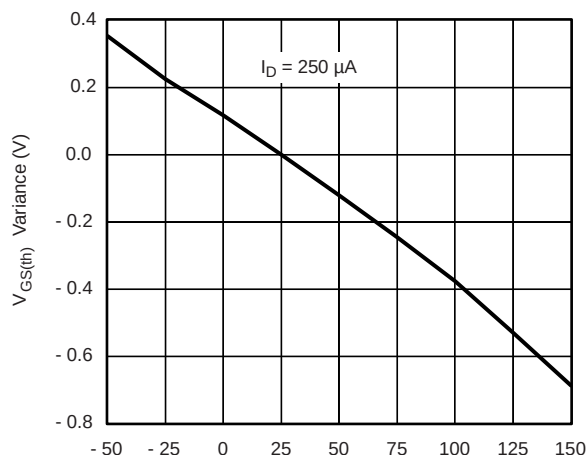
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


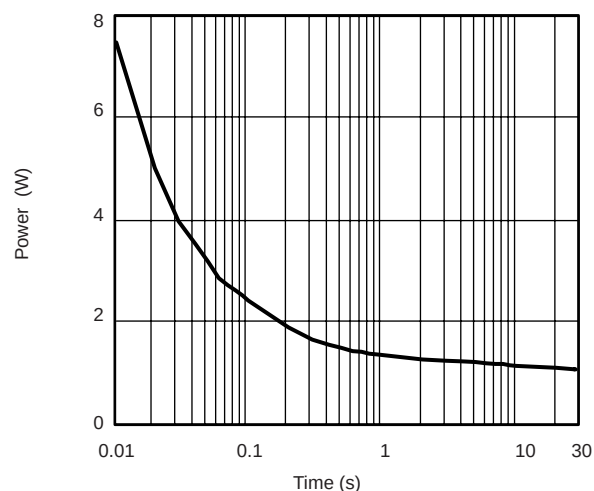
Source-Drain Diode Forward Voltage



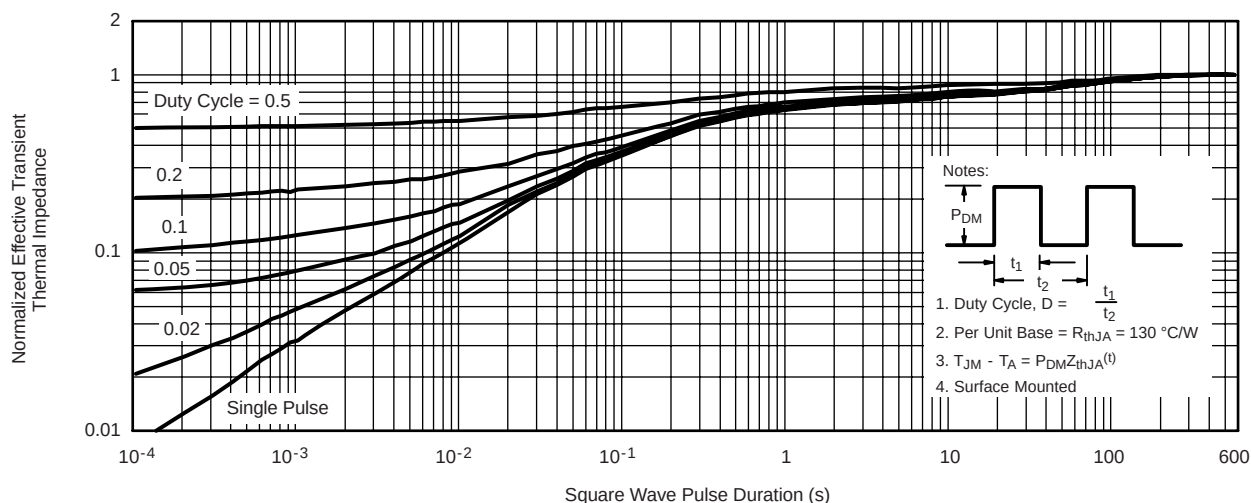
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

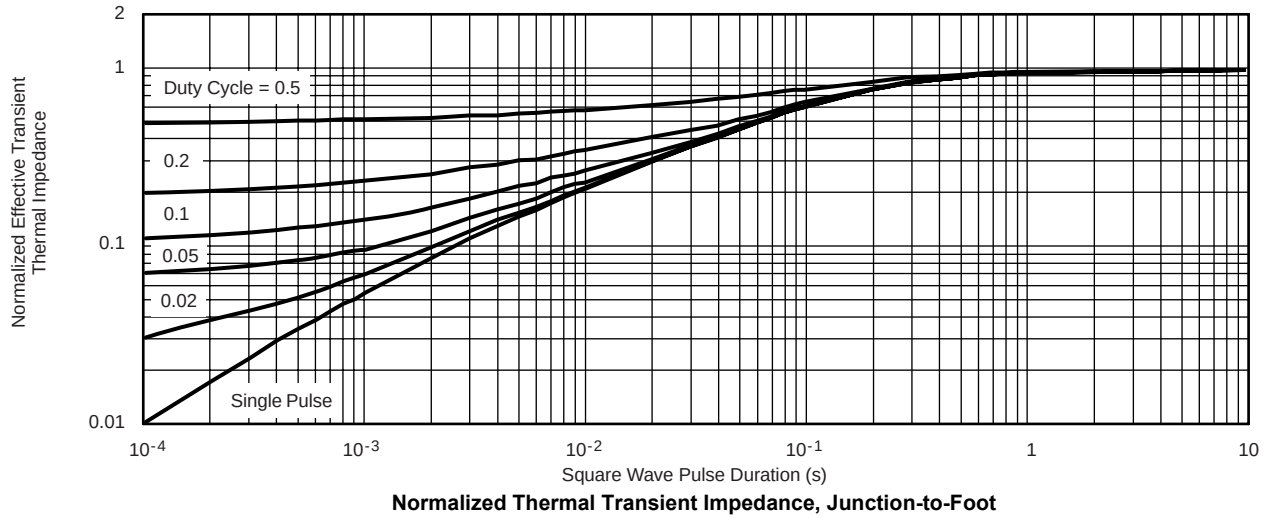


Single Pulse Power (Junction-to-Ambient)

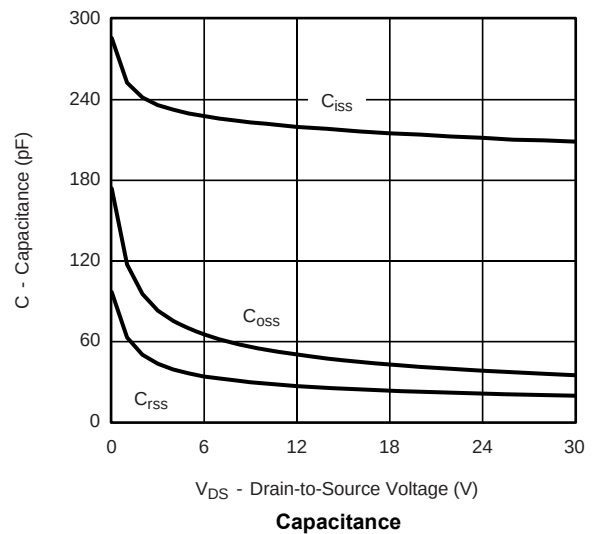
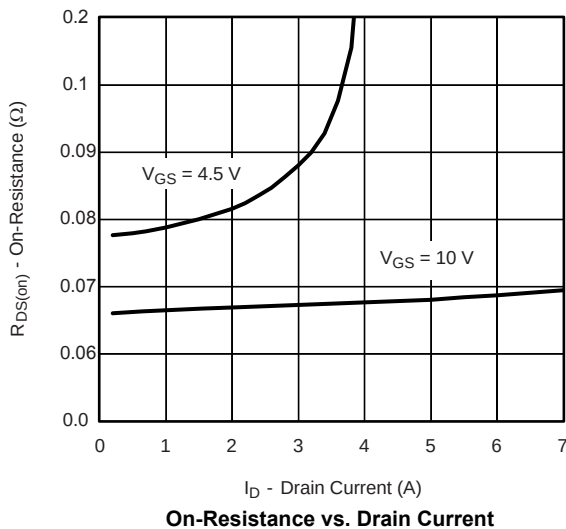
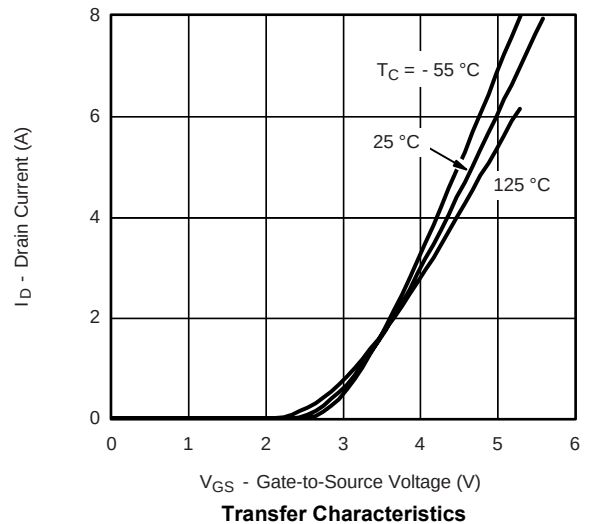
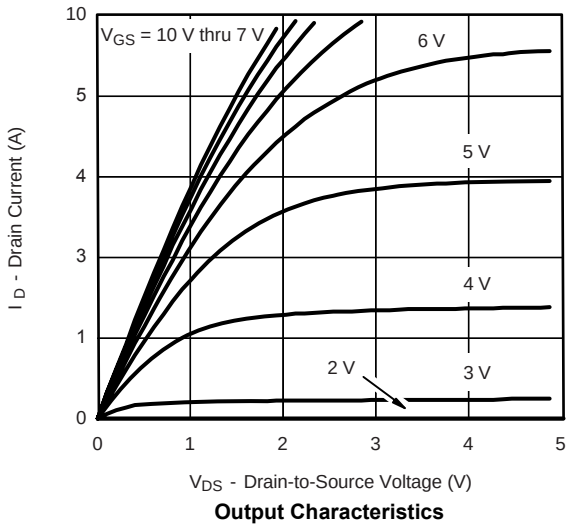


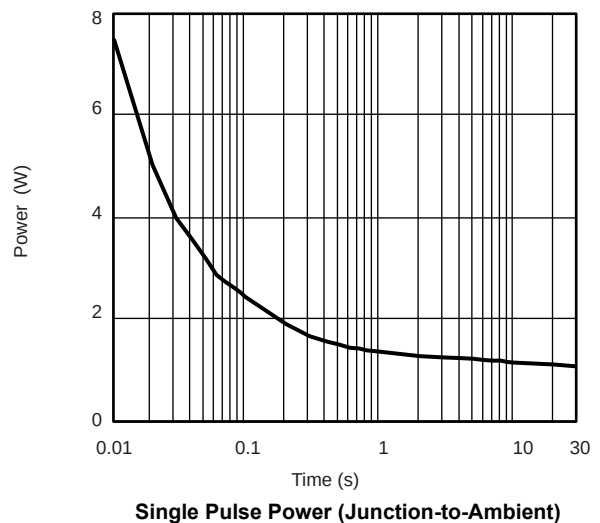
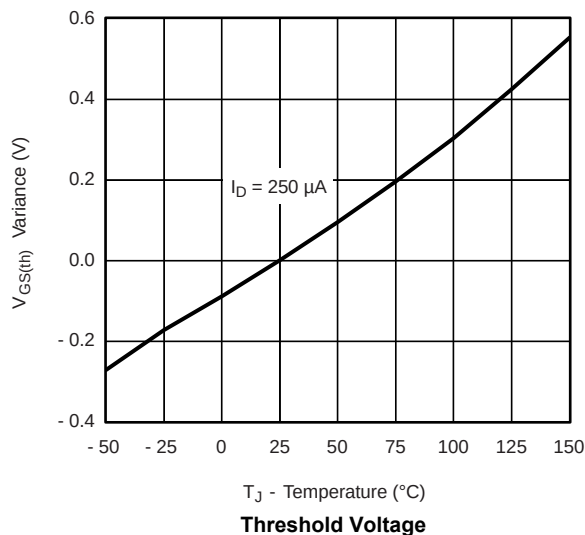
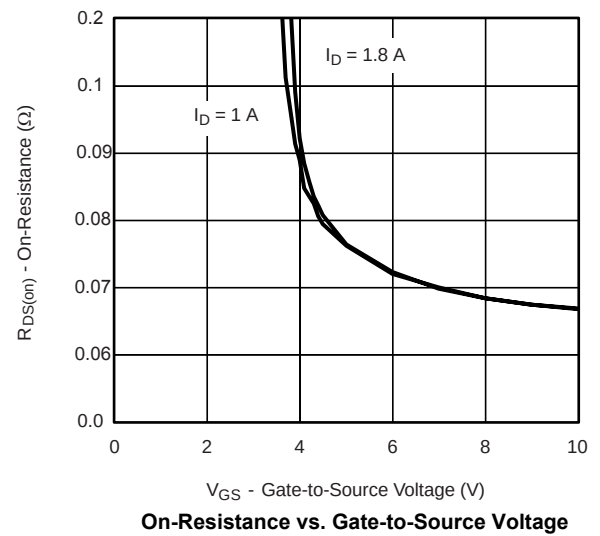
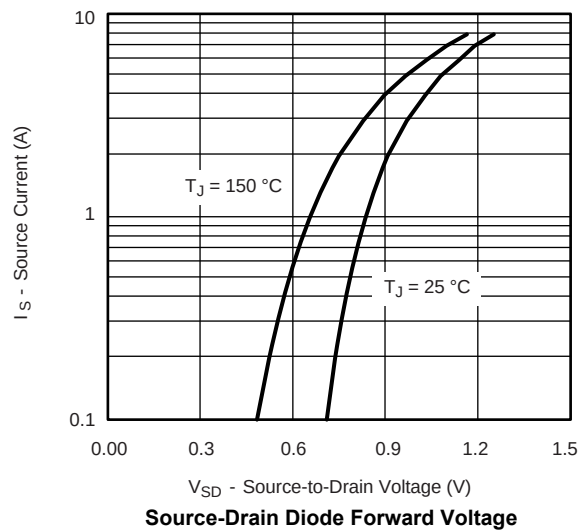
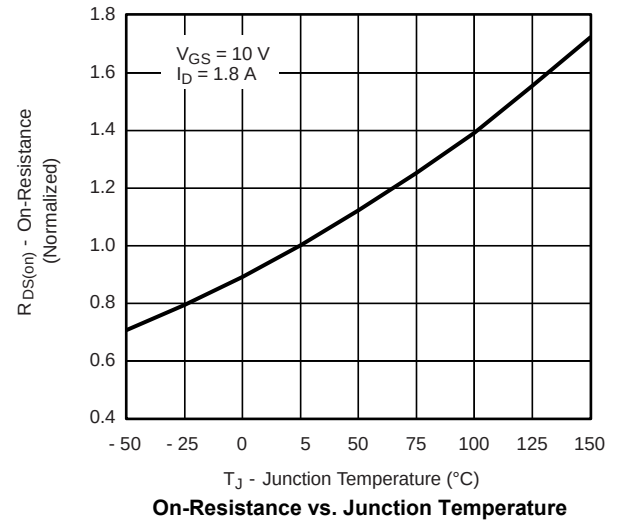
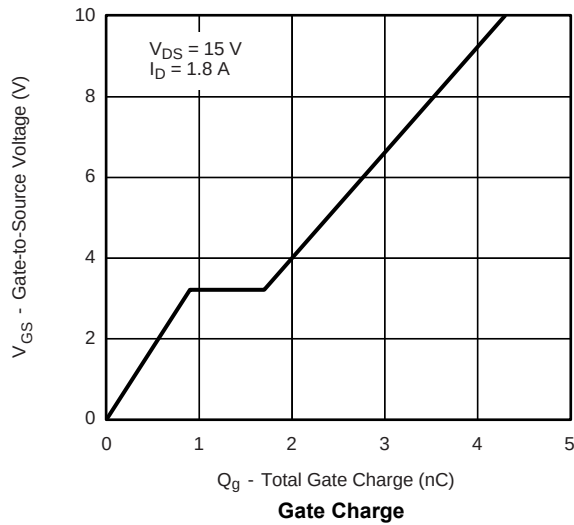
Normalized Thermal Transient Impedance, Junction-to-Ambient

N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

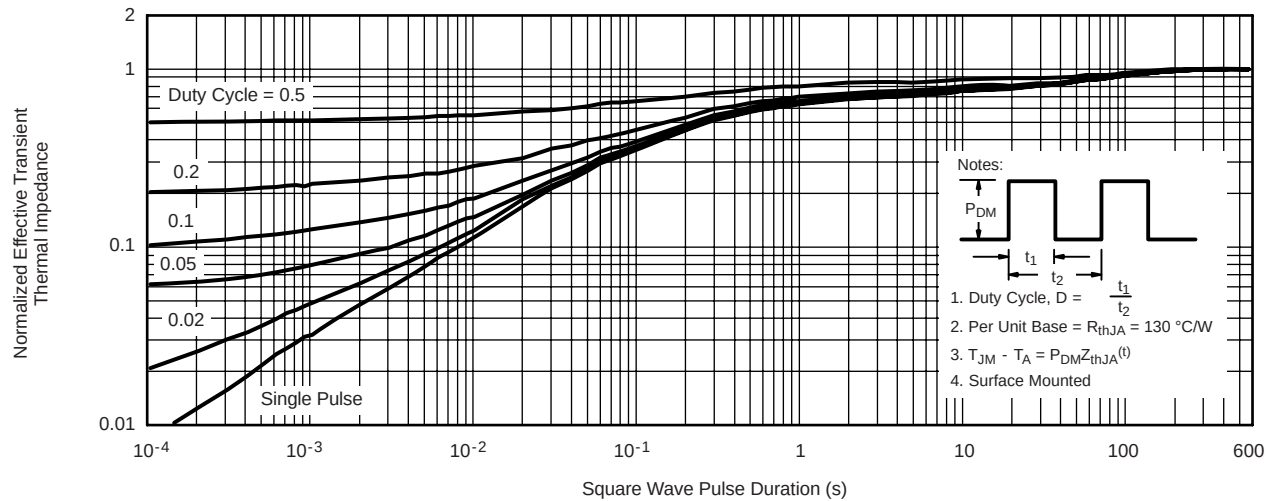


P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

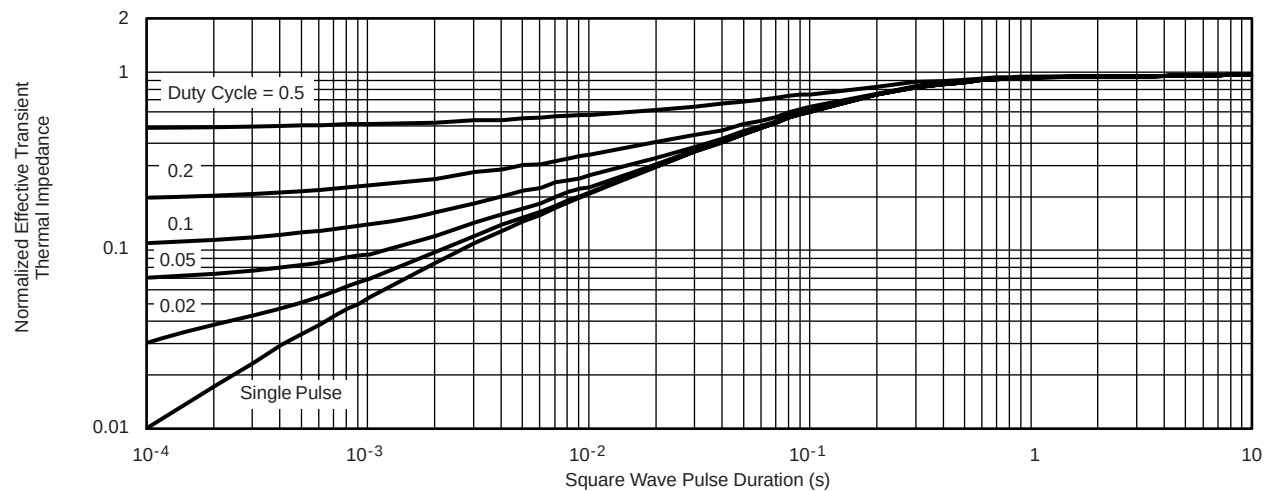


P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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