N-Channel 60 V (D-S) Super Junction Power MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(TYP.)	I_D (A)[a]
60	9.3 at V_{GS} = 10 V	55
	12.2 at V_{GS} = 4.5 V	50

FEATURES

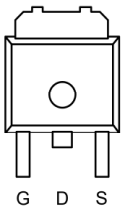
- 175 °C Junction Temperature
- DT-SJ Power MOSFET

APPLICATIONS

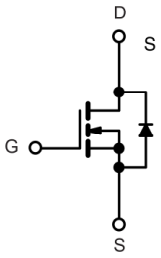
- Load Switch

RoHS COMPLIANT

TO-252



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current (T_J = 175 °C)[b]	T_C = 25 °C	I_D	55	A
	T_C = 100 °C		50[a]	
Pulsed Drain Current		I_{DM}	165	
Continuous Source Current (Diode Conduction)		I_S	50[a]	
Avalanche Current		I_{AS}	50	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E_{AS}	125	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	136	W
	T_A = 25 °C		3[b], 8.3[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	R_{thJA}	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	0.85	1.1	

Notes:
a. Package limited.
b. Surface mounted on 1" x 1" FR4 board.
c. t ≤ 10 s.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.[a]**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 175 °C			250	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	55			A
Drain-Source On-State Resistance[b]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 10 A		9.3	11	mΩ
		V_{GS} = 4.5 V, I_D = 5 A		12.2	13.5	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 10 A		60		S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 30 V, f = 1 MHz		1200		pF
Output Capacitance	C_{oss}			355		
Reverse Transfer Capacitance	C_{rss}			8.9		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 10 A		22		nC
Gate-Source Charge[c]	Q_{gs}			13.1		
Gate-Drain Charge[c]	Q_{gd}			3.36		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.6 Ω I_D ≅ 10 A, V_{GEN} = 10 V, R_g = 2.5 Ω		10		ns
Rise Time[c]	t_r			15		
Turn-Off Delay Time[c]	$t_{d(off)}$			35		
Fall Time[c]	t_f			20		
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)						
Pulsed Current	I_{SM}				165	A
Diode Forward Voltage	V_{SD}	I_F = 20 A, V_{GS} = 0 V		1	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 20 A, di/dt = 100 A/µs		45		ns

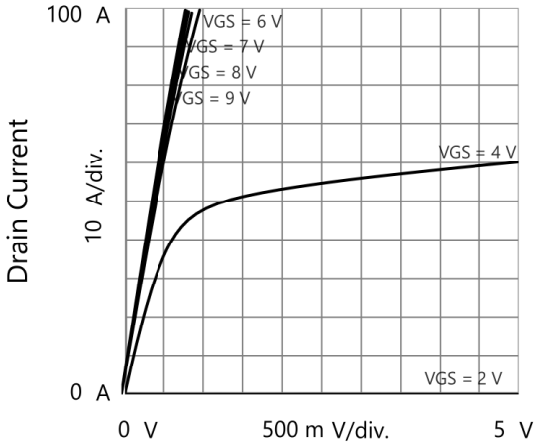
Notes:

a. For design aid only; not subject to production testing.

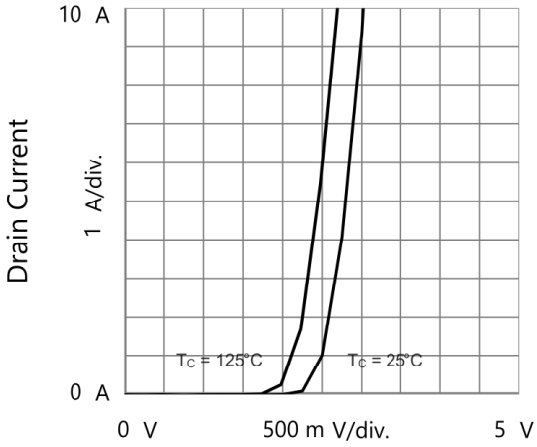
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

c. Independent of operating temperature.

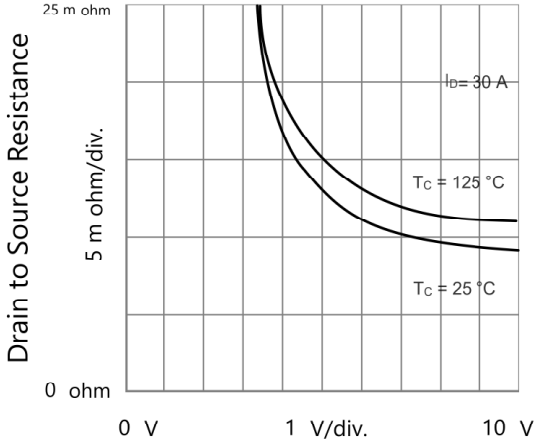
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



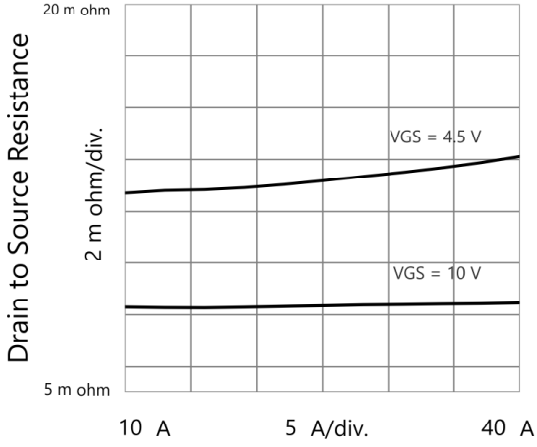
Drain to Source Voltage
Output Characteristics



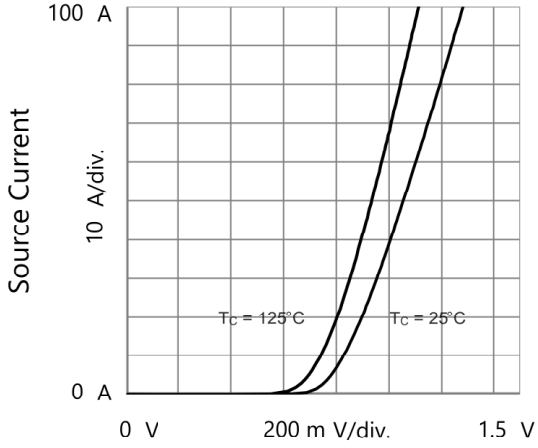
Gate to Source Voltage
Transfer Characteristics



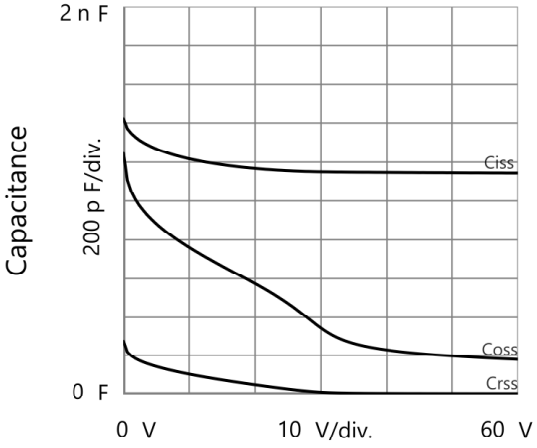
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



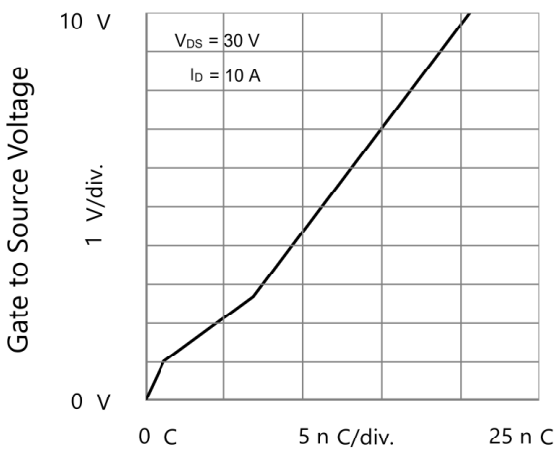
Drain Current
Drain to Source Resistance vs. Drain Current



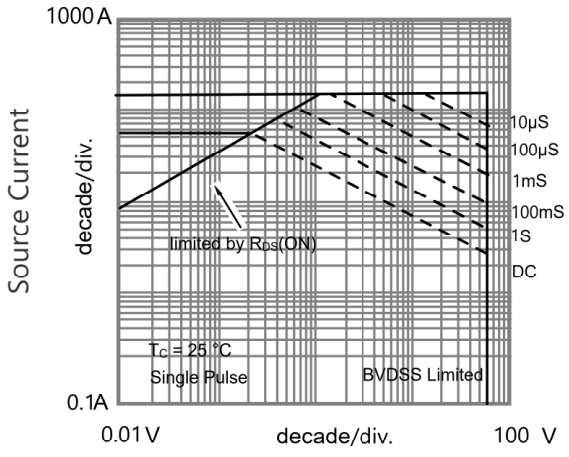
Source to Drain Voltage
Body Diode Forward Characteristics



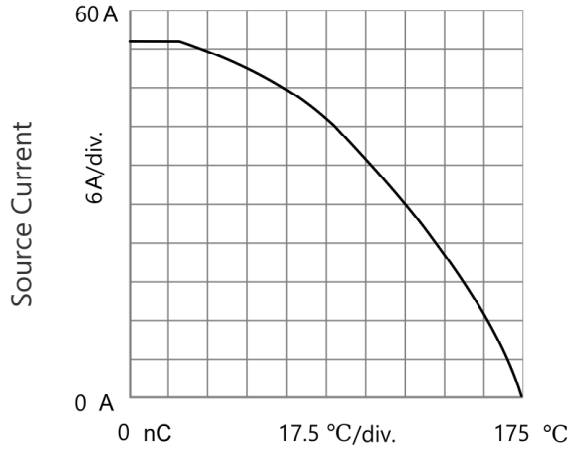
Drain to Source Voltage
Capacitances



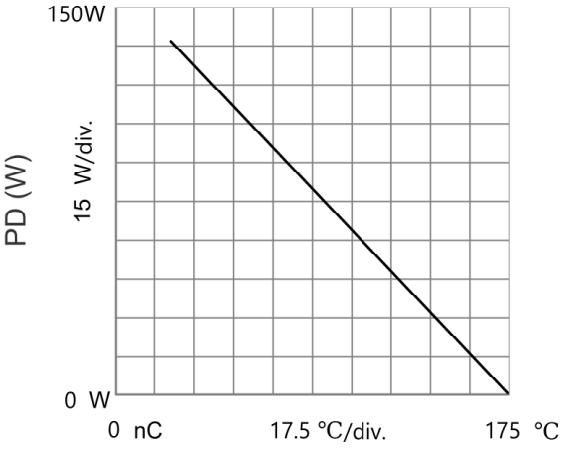
Gate to Source Voltage vs. GateCharge



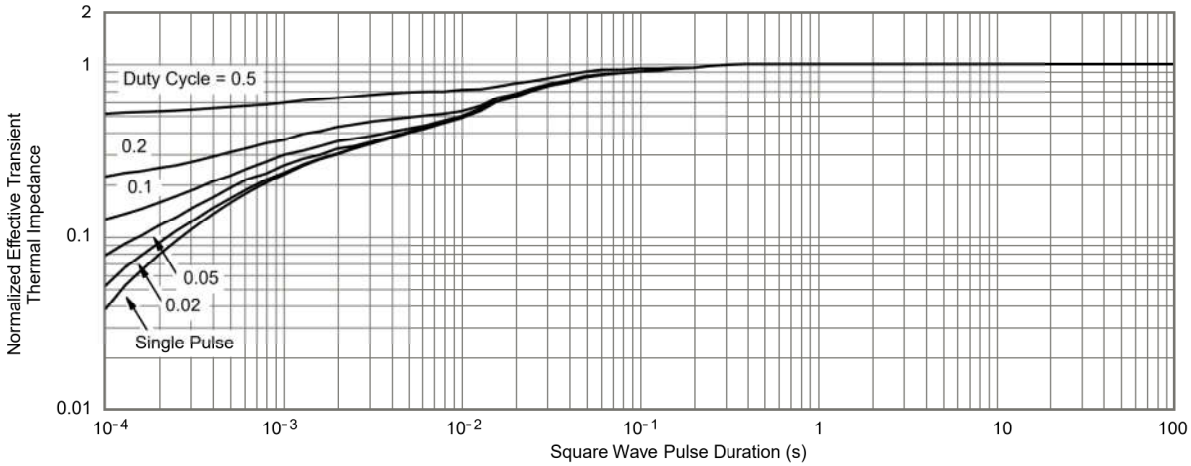
Safe Operating Area, Junction-to-Ambient



Current Derating



Power Derating



Normalized Thermal Transient Impedance, Junction-to-Case

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