N-Channel 55 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[d]	Q_g (Typ.)
55	3.9 at V_{GS} = 10 V	110	135
	6.4 at V_{GS} = 4.5 V	90	

FEATURES

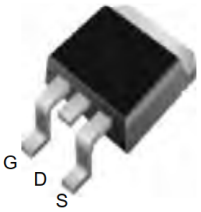
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

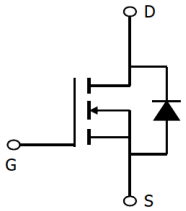
Pb RoHS COMPLIANT

APPLICATIONS

- Power Supply
  - Secondary Synchronous Rectification
- DC/DC Converter

D²PAK
(TO-263)





ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	55	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	110[d]	A
	T_C = 70 °C		90[d]	
Pulsed Drain Current		I_{DM}	330	
Avalanche Current		I_{AS}	60	
Single Avalanche Energy[a]	L = 0.1 mH	E_{AS}	180	mJ
Maximum Power Dissipation[a]	T_C = 25 °C	P_D	125[b]	W
	T_A = 25 °C[c]		3.1	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Limit**	**Unit**
Junction-to-Ambient (PCB Mount)[c]	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	1	

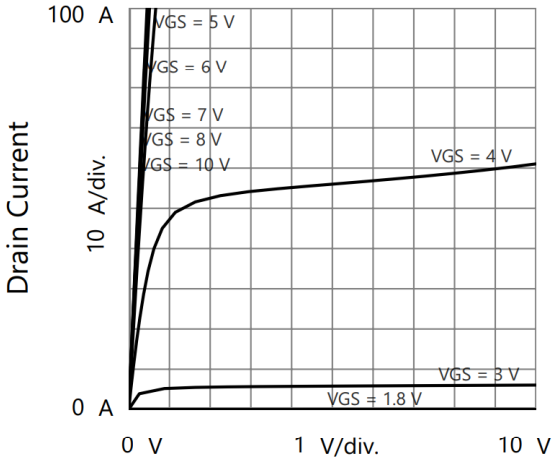
Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR-4 material).
d. Package limited.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	55	-	-	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	-	-	± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 55 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 125 °C	-	-	50	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	110	-	-	A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A	-	3.9	4.7	mΩ
		V_{GS} = 4.5 V, I_D = 20 A	-	6.4	7.6	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A	-	159	-	S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 35 V, f = 1 MHz	-	6050	-	pF
Output Capacitance	C_{oss}		-	373	-	
Reverse Transfer Capacitance	C_{rss}		-	339	-	
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 20 A	-	135	-	nC
Gate-Source Charge[c]	Q_{gs}		-	79.8	-	
Gate-Drain Charge[c]	Q_{gd}		-	13.2	-	
Gate Resistance	R_g	f = 1 MHz	-	2.09	-	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 20 V, R_L = 2 Ω I_D ≅ 10 A, V_{GEN} = 10 V, R_g = 1 Ω	-	11	-	ns
Rise Time[c]	t_r		-	7	-	
Turn-Off Delay Time[c]	$t_{d(off)}$		-	45	-	
Fall Time[c]	t_f		-	7	-	
Drain-Source Body Diode Ratings and Characteristics T_C = 25 °C[b]						
Continuous Current	I_S		-	-	110	A
Pulsed Current	I_{SM}		-	-	330	
Forward Voltage[a]	V_{SD}	I_F = 10 A, V_{GS} = 0 V	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 10 A, dI/dt = 100 A/µs	-	40	-	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$		-	2.8	-	A
Reverse Recovery Charge	Q_{rr}		-	54	-	nC

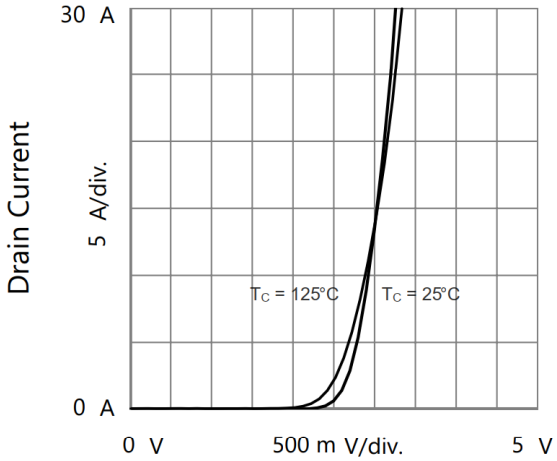
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

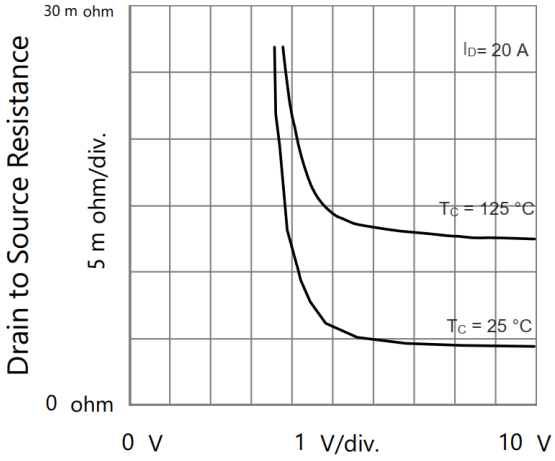
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



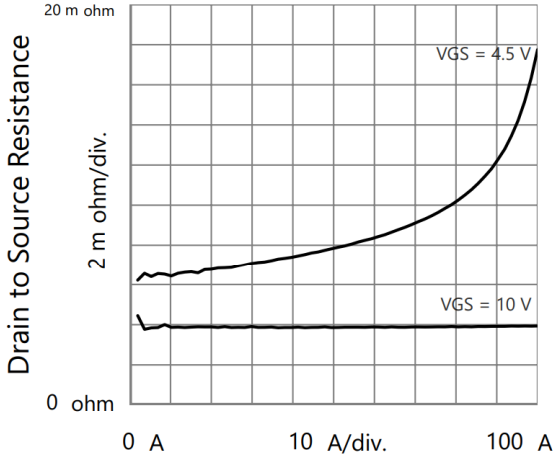
Output Characteristics



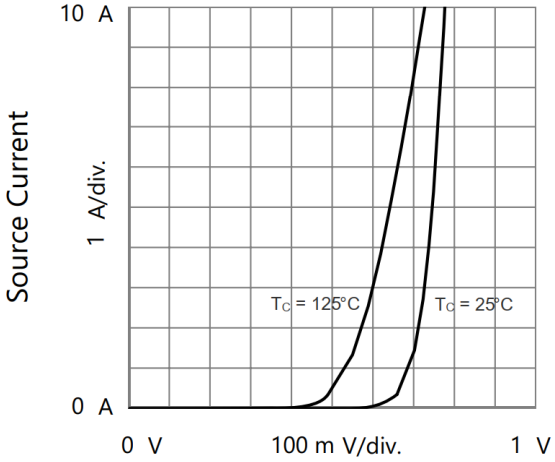
Transfer Characteristics



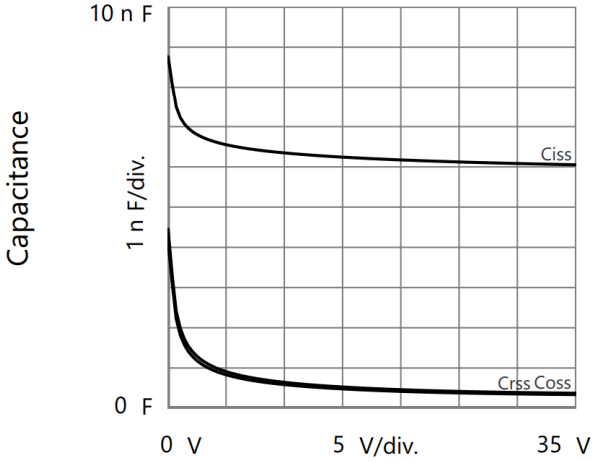
Drain to Source Resistance vs. Gate to Source Voltage



Drain to Source Resistance vs. Drain Current

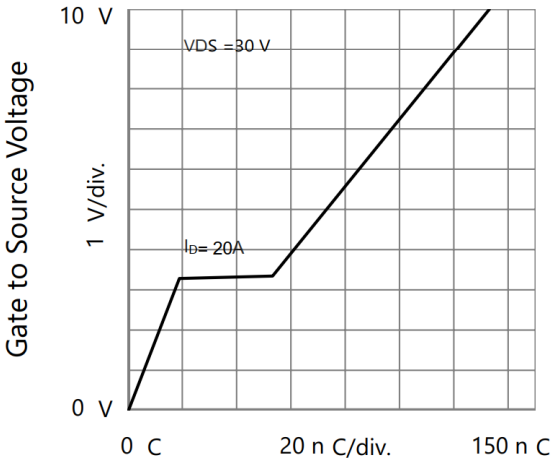


Body Diode Forward Characteristics

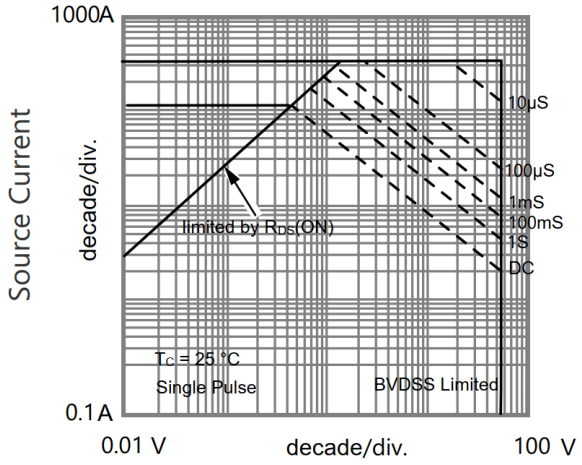


Capacitances

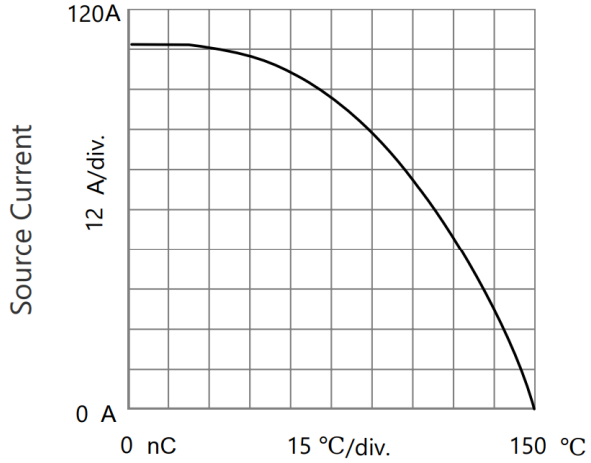
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



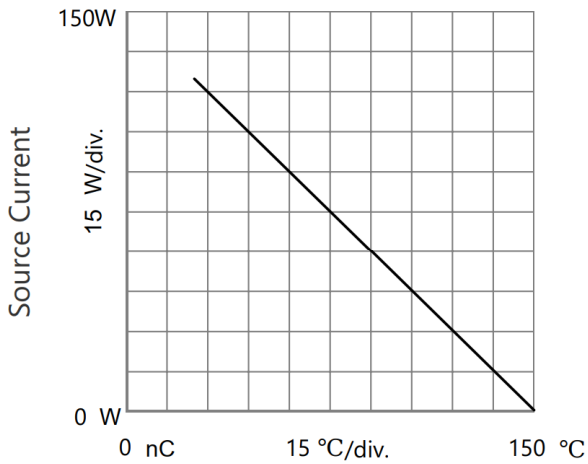
Gate to Source Voltage vs. GateCharge



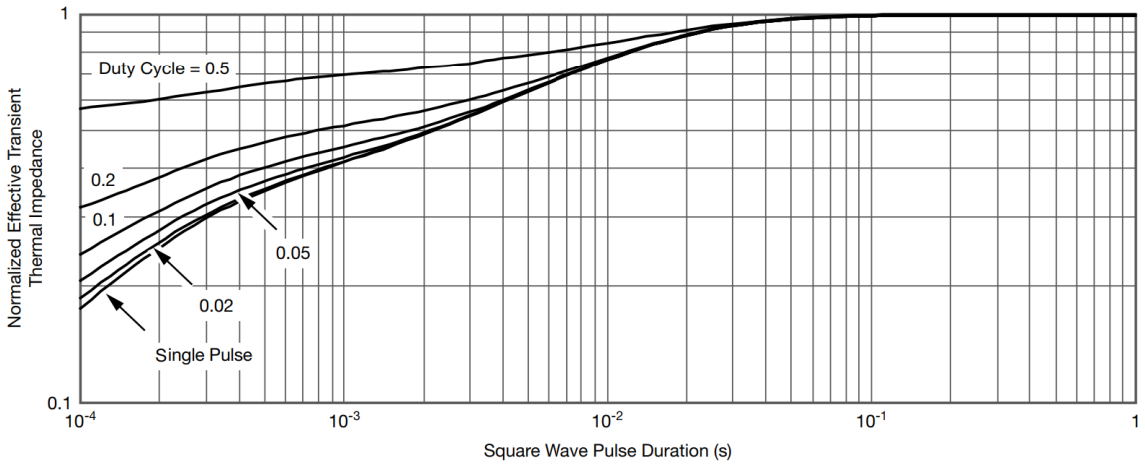
Safe Operating Area, Junction-to-Ambient



Current Derating

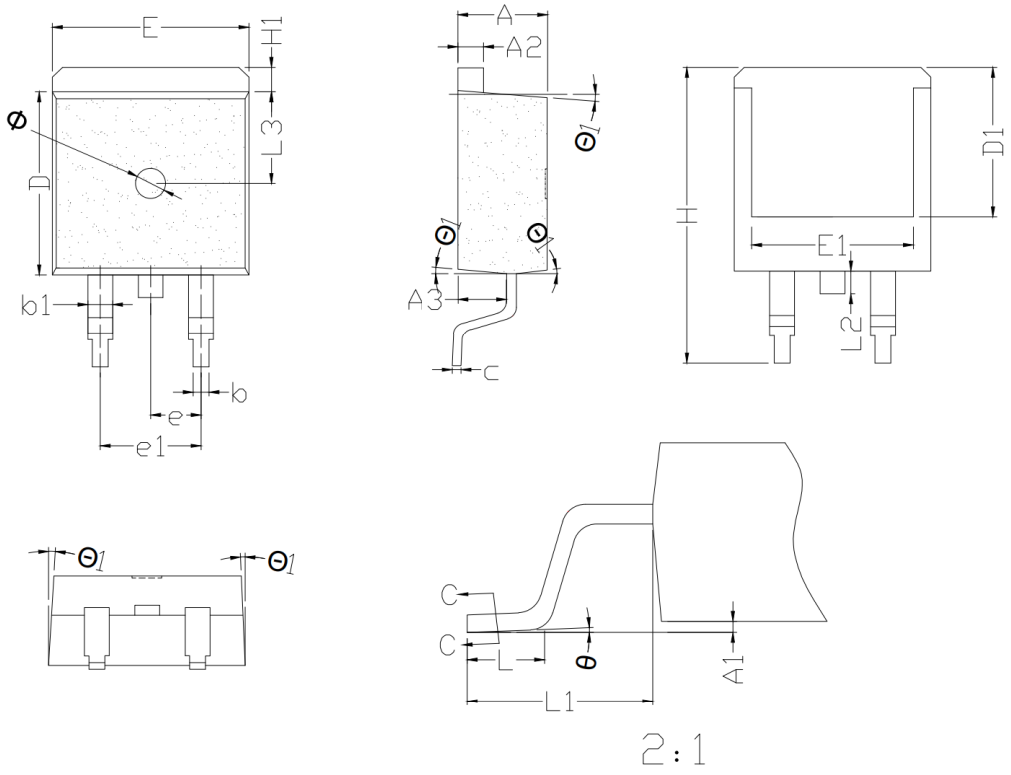


Current Derating



Normalized Thermal Transient Impedance, Junction-to-Case

TO-263 PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.10	4.50	4.80	e	2.35	2.54	2.75
A1	0.00	0.10	0.30	e1		5.08REF	
A2	1.10	1.30	1.50	H	14.50	15.15	16.00
A3	2.15	2.50	3.10	H1	1.00	1.28	1.75
b	0.60	0.80	1.05	L	1.80	2.23	2.90
b1	1.05	1.33	1.50	L1	4.30	4.75	5.50
c	0.33	0.50	0.66	L2	1.00	1.30	1.85
D	8.40	9.20	9.60	L3	0.90	4.65	9.00
D1		7.50REF		ϕ	0°	2°	5°
E	9.60	10.02	10.80	ϕ1	2°	-	7°
E1	7.60	9.88	10.30	Φ		1.5BSC	

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