P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[a]	Q_g (Typ.)
- 60	0.0022 at V_{GS} = - 10 V	- 50	126 nC
	0.0026 at V_{GS} = - 4.5 V		

FEATURES

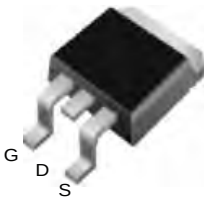
- DT-Trench Power MOSFET
- 100 % UIS Tested

APPLICATIONS

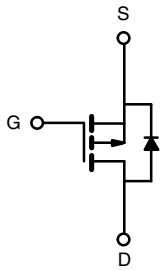
- Load Switch

RoHS COMPLIANT

D²PAK
(TO-263)



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	- 60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current [d] (T_J = 175 °C)	T_C = 25 °C	I_D	- 50	A
	T_C = 100 °C		- 37	
Pulsed Drain Current		I_{DM}	-200	
Avalanche Current	L = 0.1 mH	I_{AS}	-46	
Single Pulse Avalanche Energy [a]		E_{AS}	753	mJ
Power Dissipation	T_C = 25 °C [c]	P_D	161	W
	T_A = 25 °C [b]		3.37	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +150	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	TYPICAL	UNIT
Junction-to-Ambient	PCB mount [b]	R_{thJA}	40	°C/W
Junction-to-Case		R_{thJC}	0.75	

Notes

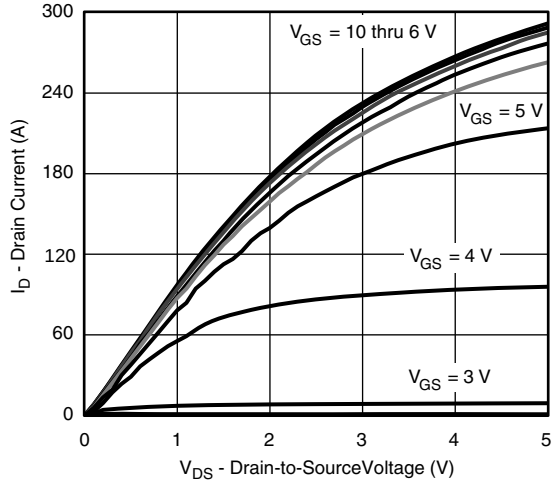
a. Duty cycle ≤ 1 %.
b. When mounted on 1" square PCB (FR4 material).
c. See SOA curve for voltage derating.

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	- 60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T$	I_D = - 250 µA		58		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.2		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1		- 3	V
Gate-Source 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			- 10	µA
		V_{DS} = - 60 V, V_{GS} = 0 V, T_J = 55 °C			- 25	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = - 5 V, V_{GS} = - 10 V	- 50			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 30 A		0.022	0.027	Ω
		V_{GS} = - 4.5 V, I_D = - 20 A		0.026	0.033	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 30 A	16			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 25 V, V_{GS} = 0 V, f = 1 MHz		3376		pF
Output Capacitance	C_{oss}			1090		
Reverse Transfer Capacitance	C_{rss}			595		
Total Gate Charge	Q_g	V_{DS} = - 30 V, V_{GS} = - 10 V, I_D = - 30 A		126	195	nC
Gate-Source Charge	Q_{gs}			36		
Gate-Drain Charge	Q_{gd}			73		
Gate Resistance	R_g	f = 1 MHz		5.5		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 2 V, R_L = 2 Ω $I_D \cong$ - 10 A, V_{GEN} = - 10 V, R_g = 1 Ω		35		ns
Rise Time	t_r			96		
Turn-Off Delay Time	$t_{d(off)}$			50		
Fall Time	t_f			82		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 50	A
Pulse Diode Forward Current[a]	I_{SM}				- 200	
Body Diode Voltage	V_{SD}	I_S = - 30 A		- 1	- 1.5	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 30 A, di/dt = 100 A/µs, T_J = 25 °C		75	108	ns
Body Diode Reverse Recovery Charge	Q_{rr}			149	320	nC
Reverse Recovery Fall Time	t_a			29		ns
Reverse Recovery Rise Time	t_b			16		

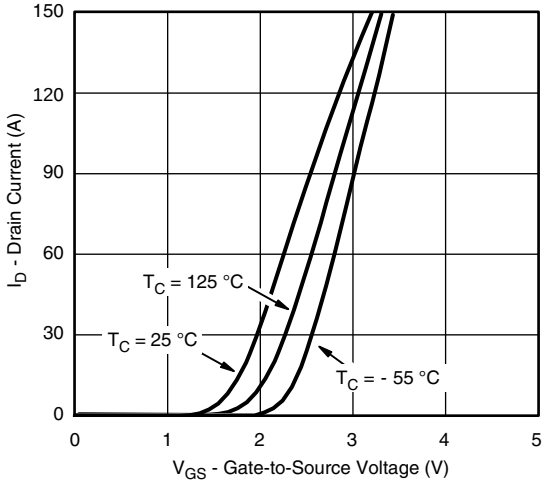
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

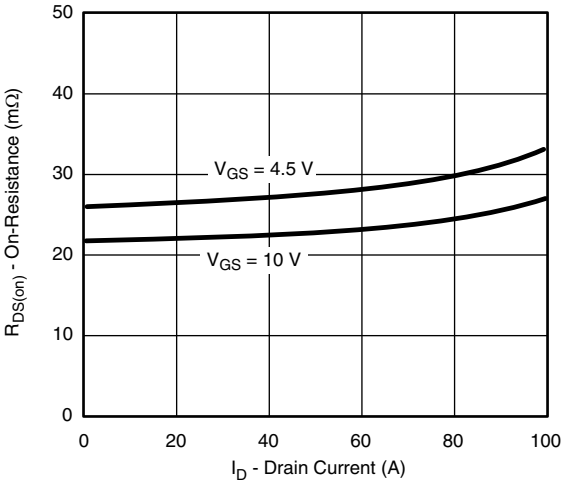
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



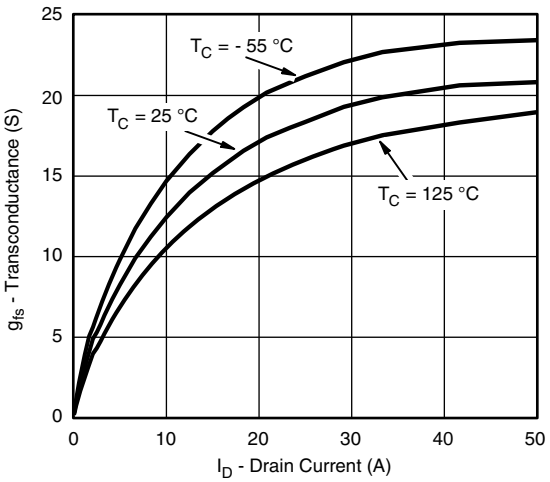
Output Characteristics



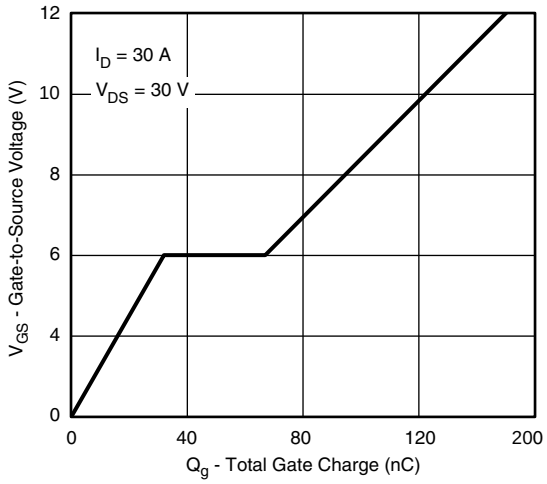
Transfer Characteristics



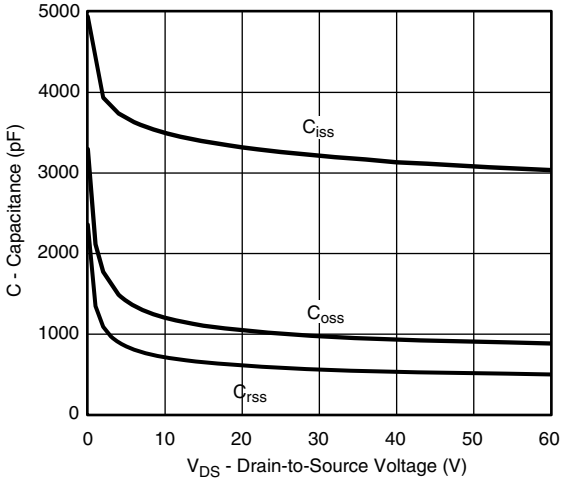
On-Resistance vs. Drain Current



Transconductance

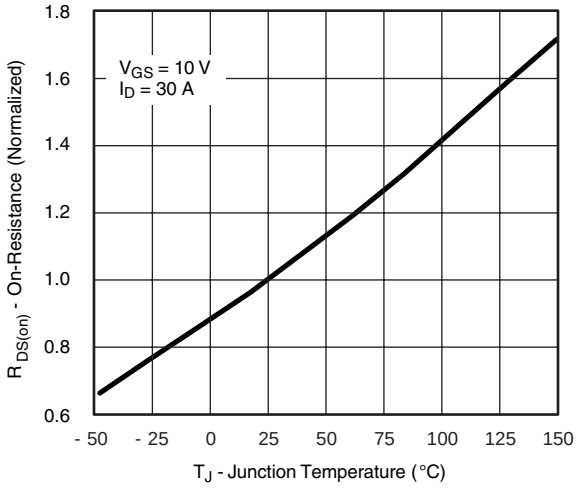


Gate Charge

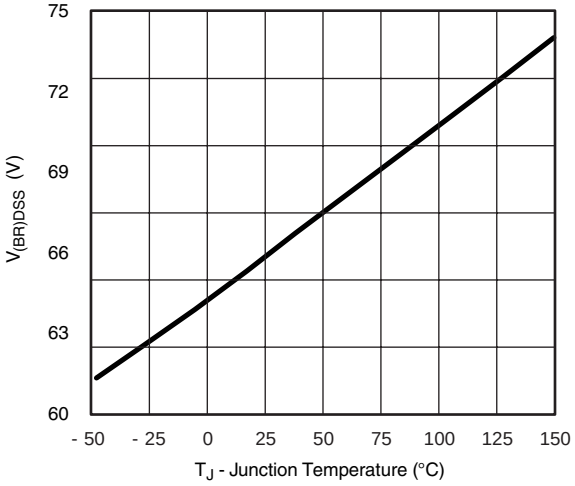


Capacitance

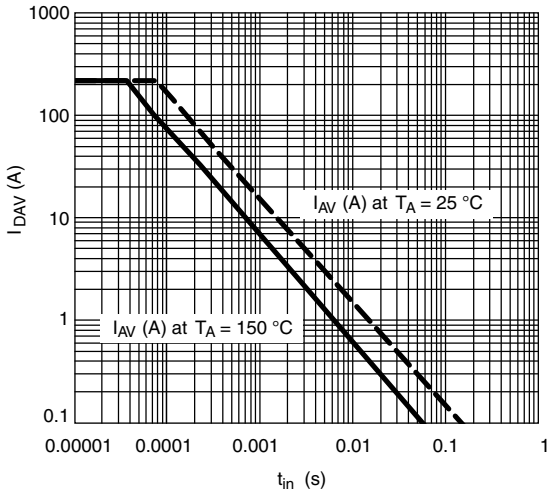
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



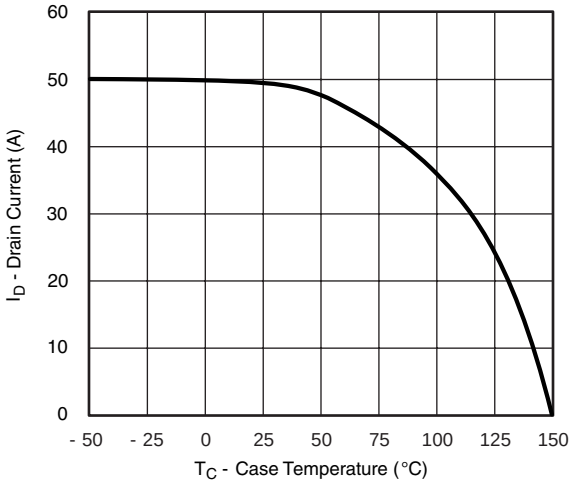
On-Resistance vs. Junction Temperature



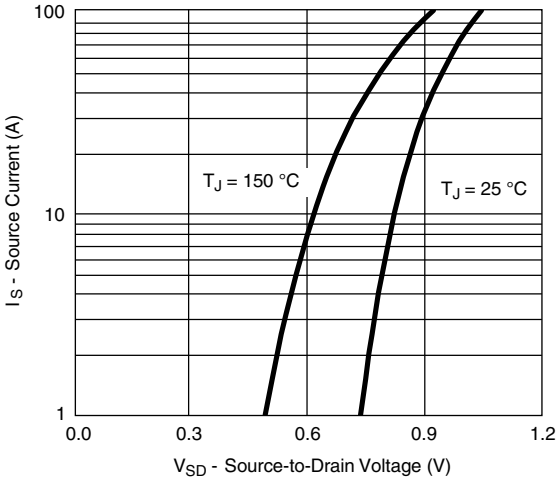
Drain Source Breakdown vs. Junction Temperature



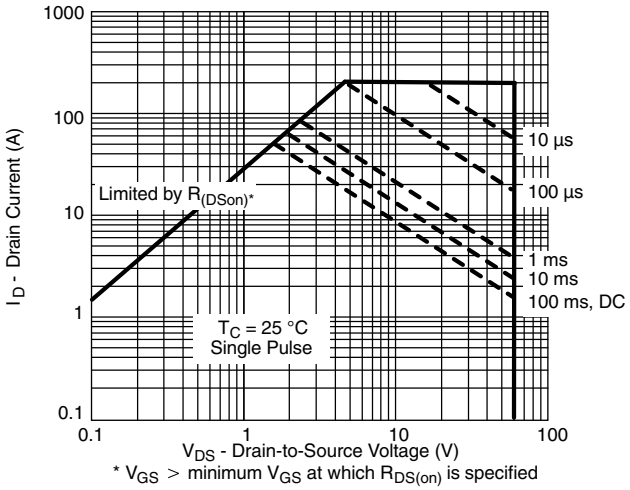
Avalanche Current vs. Time



Maximum Avalanche and Drain Current vs. Case Temperature

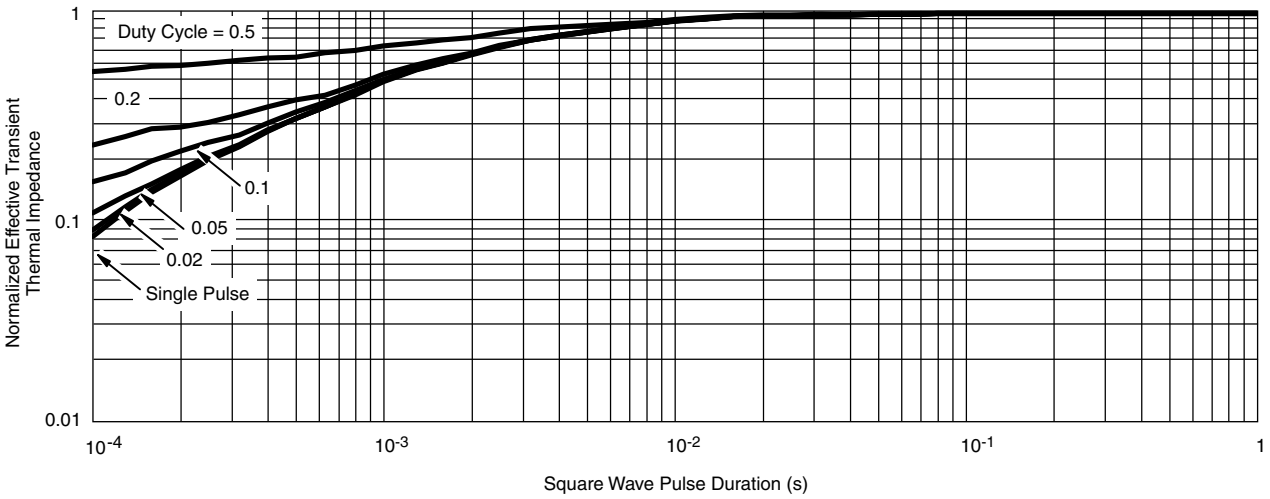


Source-Drain Diode Forward Voltage



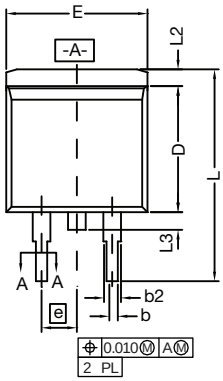
Safe Operating Area

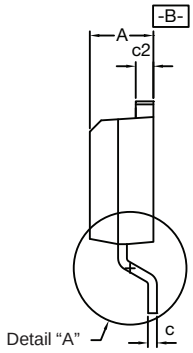
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

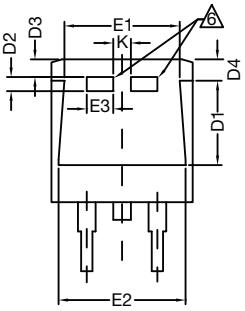


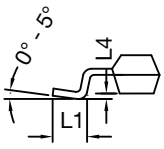
Normalized Thermal Transient Impedance, Junction-to-Case

TO-263 (D^2PAK): 3-LEAD

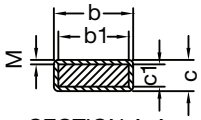








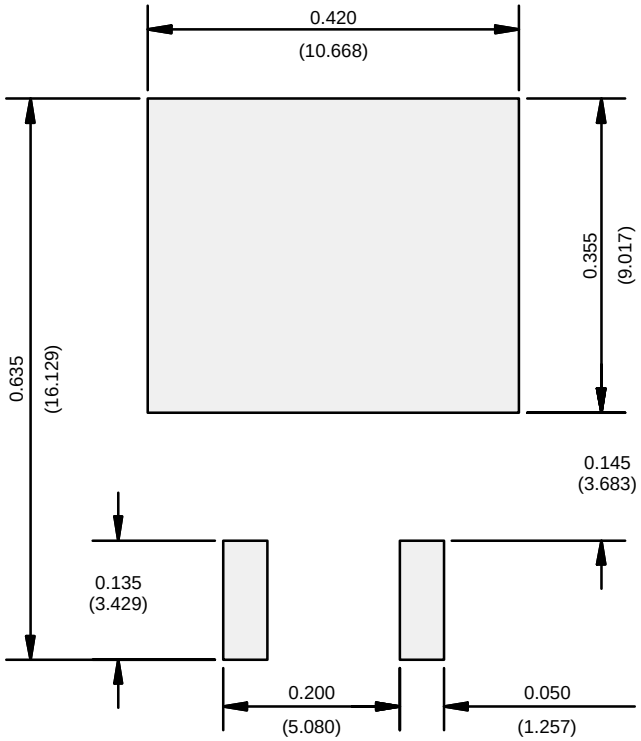
DETAIL A (ROTATED 90°)



SECTION A-A

DIM.		INCHES		MILLIMETERS	
		MIN.	MAX.	MIN.	MAX.
A		0.160	0.190	4.064	4.826
b		0.020	0.039	0.508	0.990
b1		0.020	0.035	0.508	0.889
b2		0.045	0.055	1.143	1.397
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2		0.045	0.055	1.143	1.397
D		0.340	0.380	8.636	9.652
D1		0.220	0.240	5.588	6.096
D2		0.038	0.042	0.965	1.067
D3		0.045	0.055	1.143	1.397
D4		0.044	0.052	1.118	1.321
E		0.380	0.410	9.652	10.414
E1		0.245	-	6.223	-
E2		0.355	0.375	9.017	9.525
E3		0.072	0.078	1.829	1.981
e		0.100 BSC		2.54 BSC	
K		0.045	0.055	1.143	1.397
L		0.575	0.625	14.605	15.875
L1		0.090	0.110	2.286	2.794
L2		0.040	0.055	1.016	1.397
L3		0.050	0.070	1.270	1.778
L4		0.010 BSC		0.254 BSC	
M		-	0.002	-	0.050

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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