N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

BV_{DSS}	60V
$R_{DSON(MAX.)}$	0.032Ω
I_D	30A

FEATURES

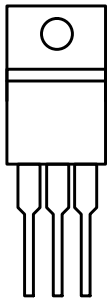
- Surface Mount
- Logic-Level Gate Drive
- Fast Switching

RoHS COMPLIANT

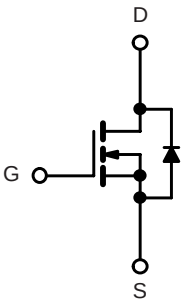
APPLICATIONS

- LED lamp
- Load switch
- Uninterruptible power supply

TO-220AB



G D S
Top View



N-Channel MOSFET

Absolute Maximum Ratings (T_C = 25 °C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current@10V	T_C = 25 °C	I_D	30	A
	T_C = 100 °C		18	
Pulsed Drain Current		I_{DM}	100	A
Single Pulse Avalanche Energy	L = 0.1 mH	E_{AS}	48	mJ
Total Power Dissipation	T_C = 25 °C	P_D	37.8	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	TYP.	MAX.	Unit
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	-	62	°C / W
Thermal resistance, junction-to-case	$R_{\theta JC}$	-	3.3	

Electrical Characteristics T_J = 25°C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V , I_D = 250 μA	60	-	-	V
Gate-body Leakage current	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 , T_J = 25 °C	-	-	1	μA
		V_{DS} = 60 V , V_{GS} = 0 V , T_J = 125 °C	-	-	100	
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 μA	1.2		2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V , I_D = 20 A	-	0.025	0.032	Ω
		V_{GS} = 4.5 V , I_D = 20 A	-	0.032	0.041	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 30 V , V_{GS} = 0 V , f = 1 MHz	-	1062	-	pF
Output Capacitance	C_{oss}		-	64	-	
Reverse Transfer Capacitance	C_{rss}		-	56	-	
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 30 V , V_{GS} = 10 V , I_D = 20 A	-	28	-	nC
Gate-Source Charge	Q_{gs}		-	5.9	-	
Gate-Drain Charge	Q_{gd}		-	5.4	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V , I_D ≅ 20 A , V_{GEN} = 10 V , R_G = 3 Ω	-	8.6	-	nS
Rise Time	t_r		-	8.7	-	
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	
Fall Time	t_f		-	7	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	I_S = 20 A , V_{GS} = 0 V	-	-	1.2	V
Continuous Source-Dranin Diode Current	I_S	T_J = 25 °C	-	-	30	A
Continuous Source Current	I_{SM}		-	-	100	A
Reverse Recovery Charge	Q_{rr}	T_J = 25 °C , I_F = 20 A , dI/dt = 100 A/μs	-	13	-	nC
Reverse Recovery Time	t_{rr}		-	20	-	ns

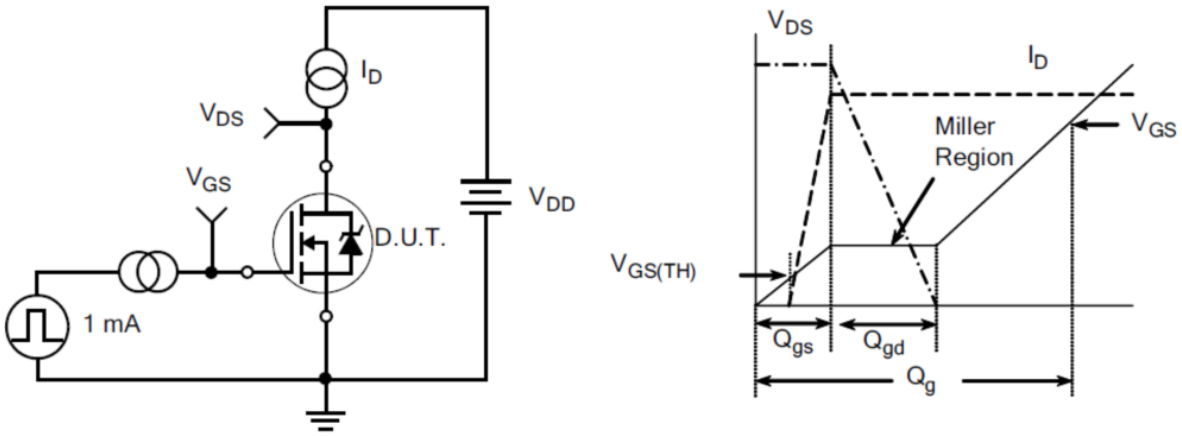
Notes:

a. L=0.5mH, V_{DD}=30V, Start T_J=25°C.

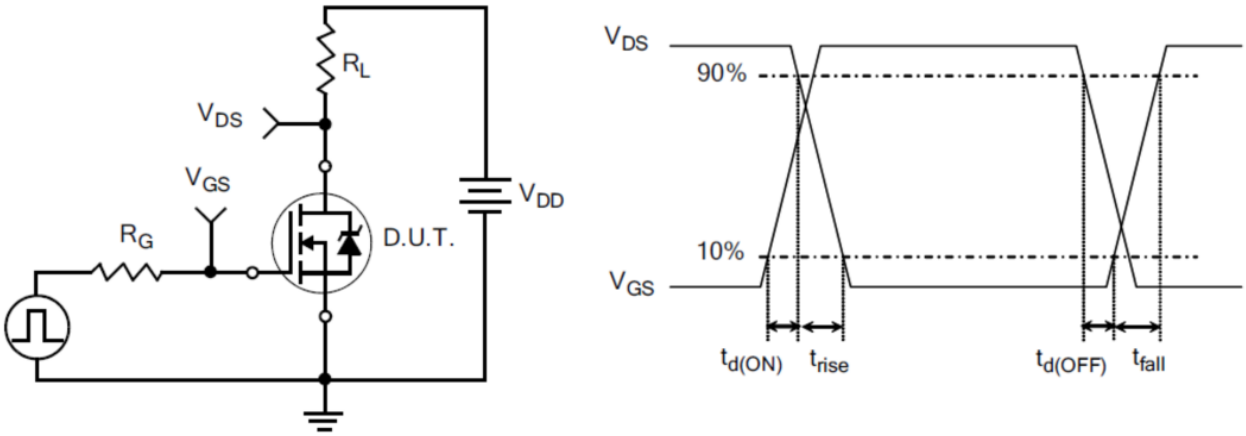
b. Limited by maximum junction temperature.

c. Repetitive Rating: Pulse width limited by maximum junction temperature.

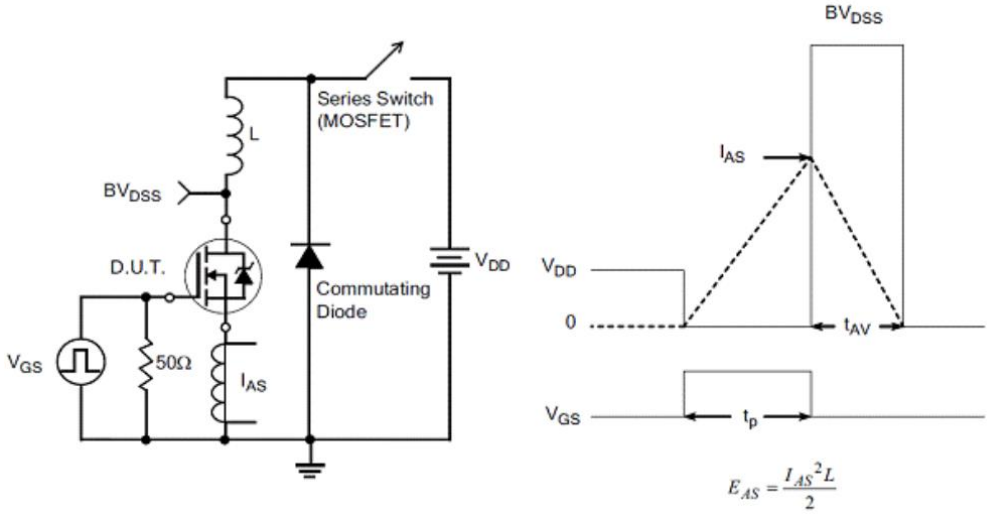
Test circuit and Waveform



Gate Charge Test Circuit and Waveform

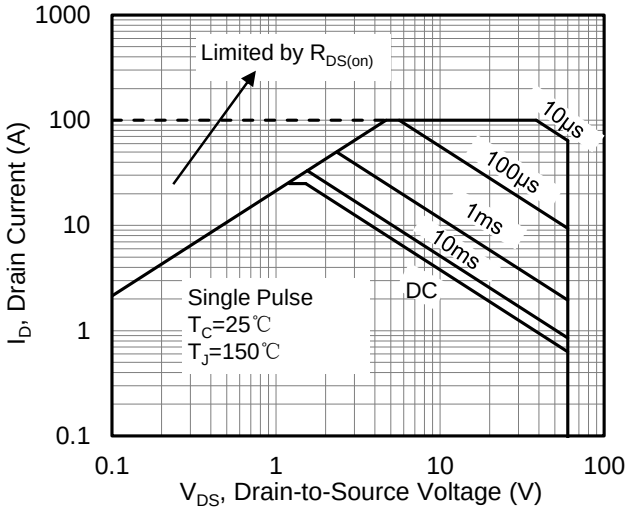


Resistive Switching Test Circuit and Waveform

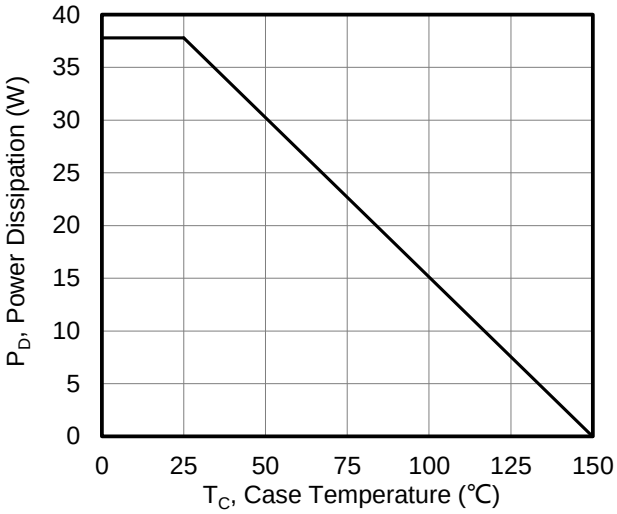


Unclamped Inductive Switching Test Circuit and Waveform

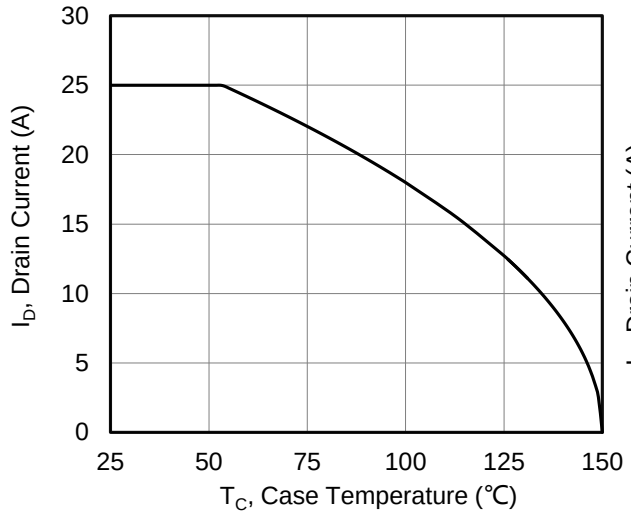
TYPICAL CHARACTERISTICS (25 °C unless noted)



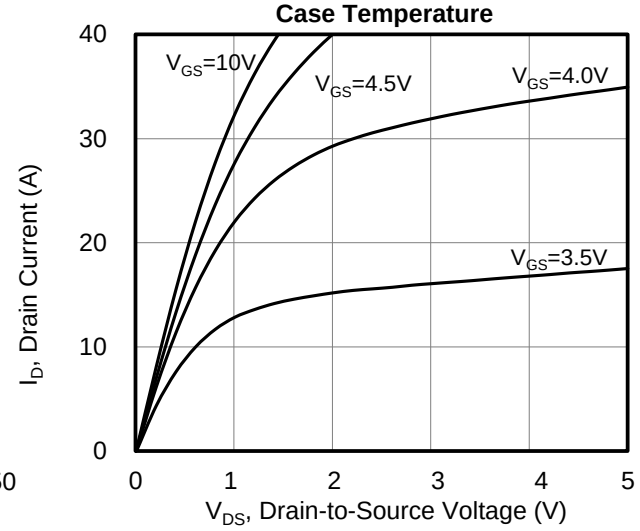
Maximum Safe Operating Area



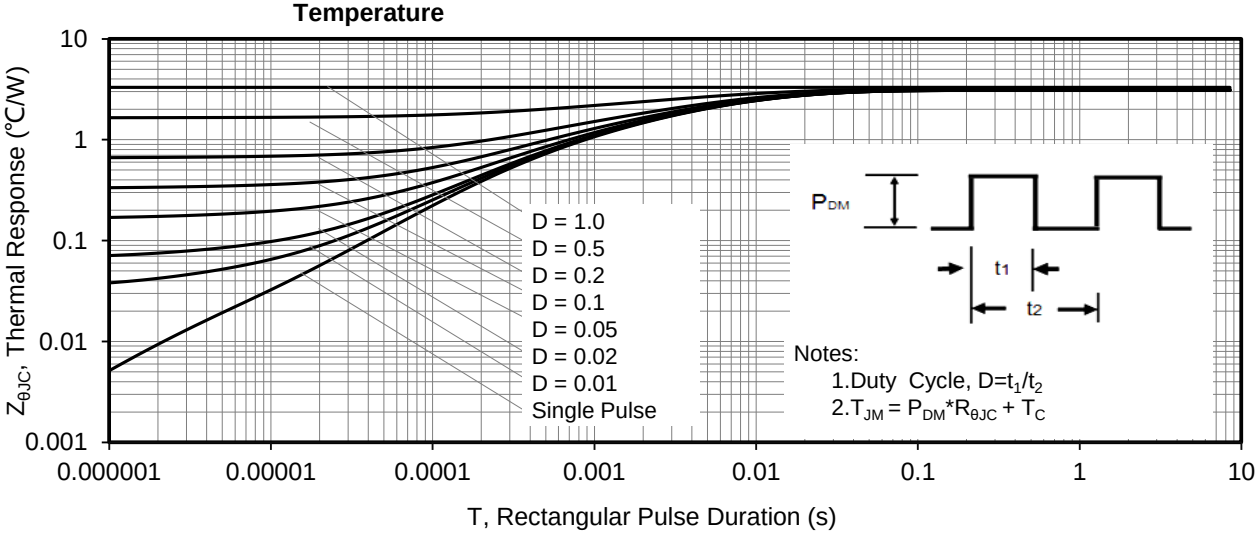
Maximum Power Dissipation vs Case Temperature



Maximum Continuous Drain Current vs Case Temperature

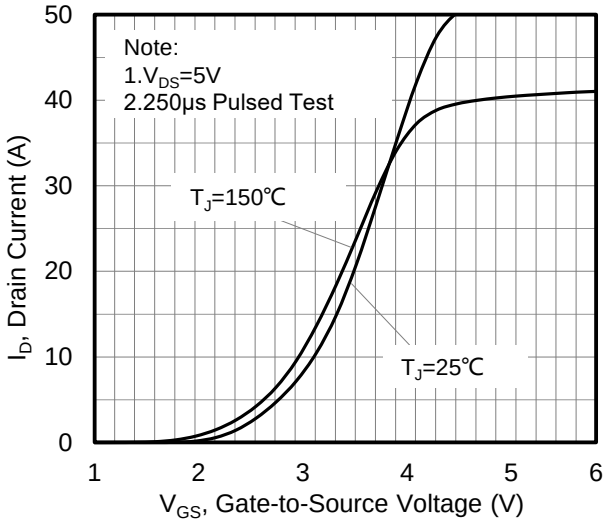


Typical output Characteristics



Maximum Effective Thermal Impedance, Junction to Case

TYPICAL CHARACTERISTICS (25 °C unless noted)



Typical Transfer Characteristics

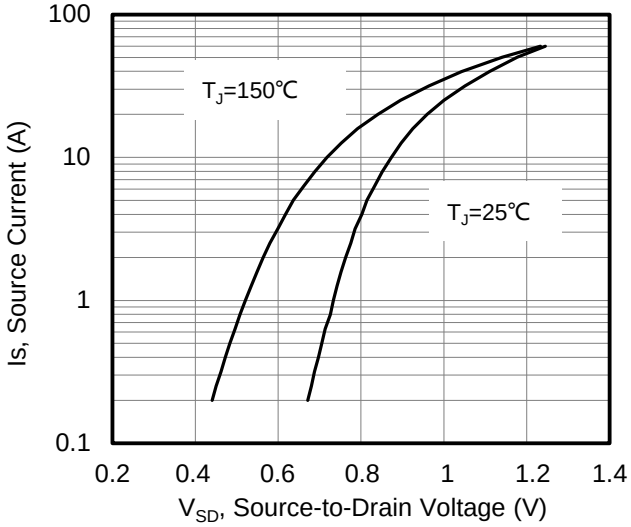
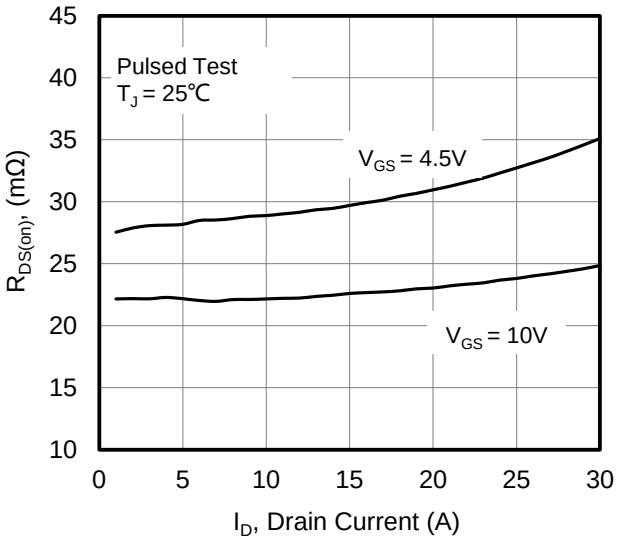
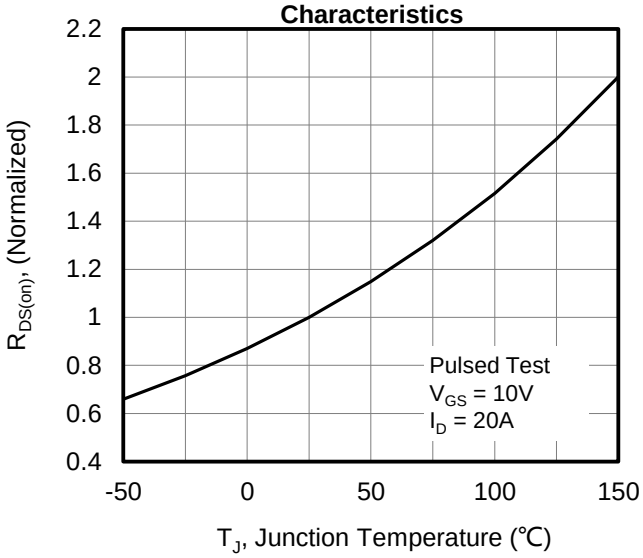


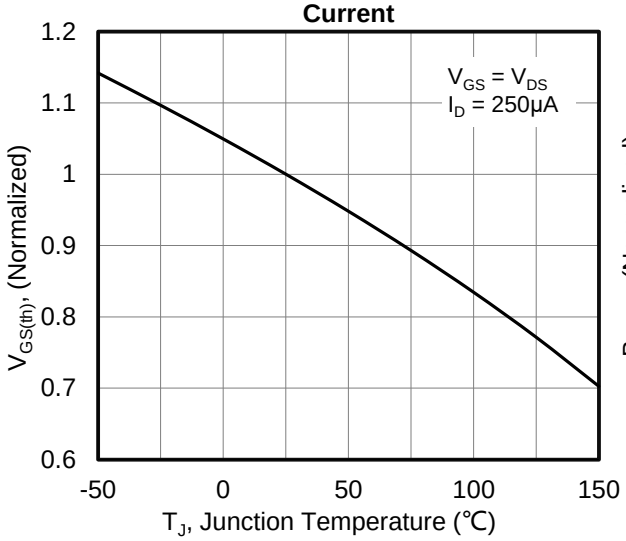
Figure ical Body Diode Transfer Characteristics



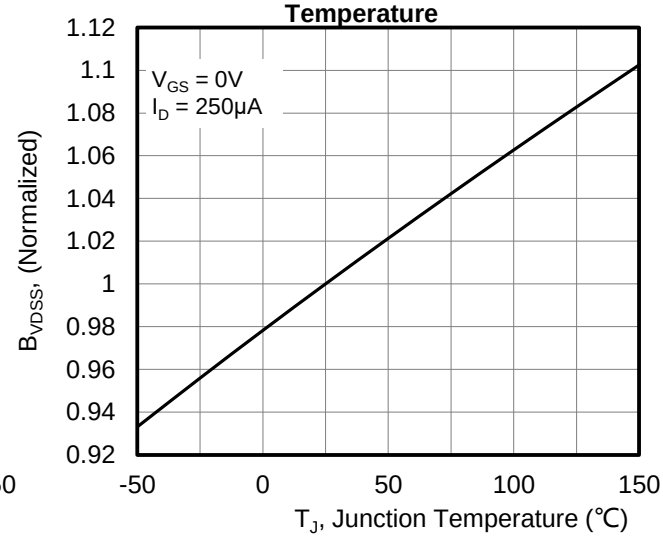
Drain-to-Source On Resistance vs Drain Current



Normalized On Resistance vs Junction Temperature

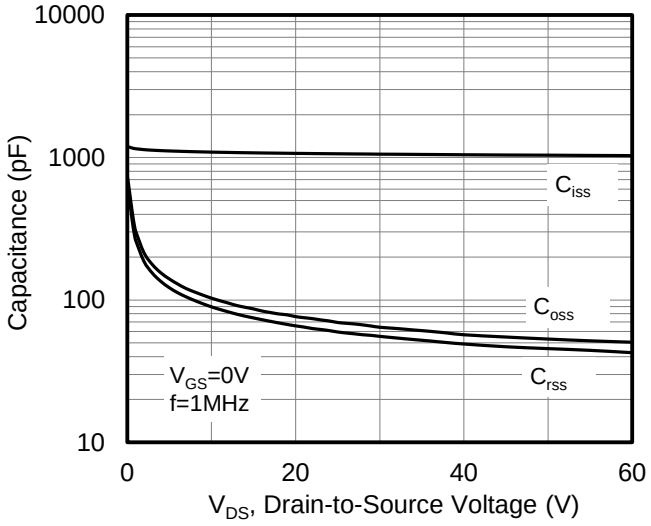


Normalized Threshold Voltage vs Junction Temperature

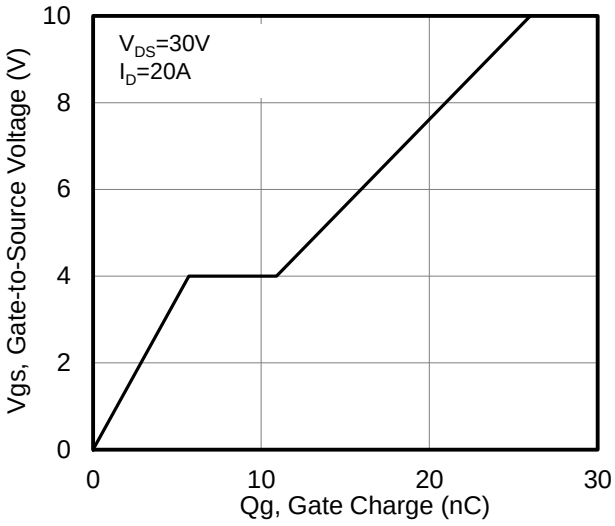


Normalized Breakdown Voltage vs Junction Temperature

TYPICAL CHARACTERISTICS (25 °C unless noted)

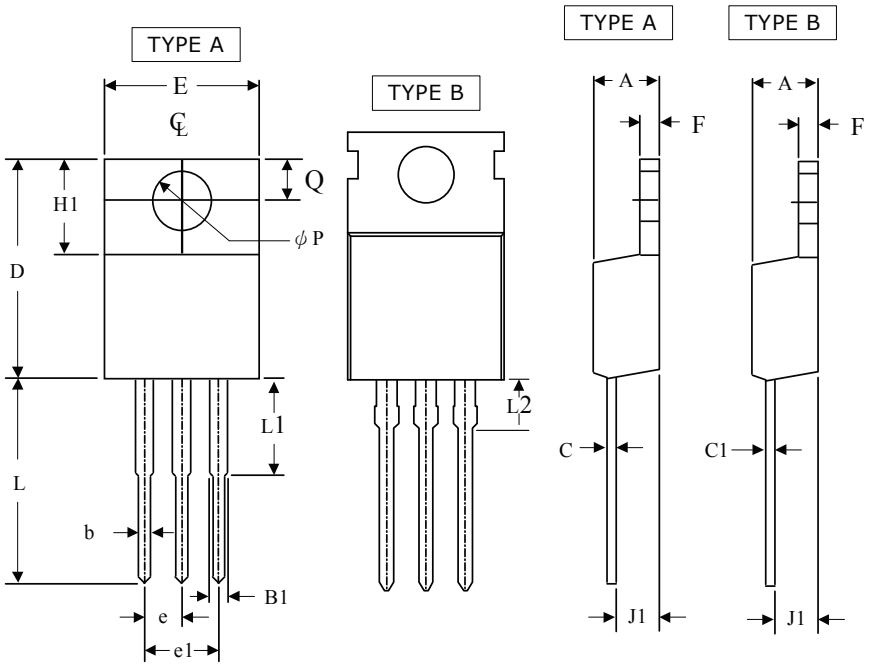


Capacitance Characteristics



Typical Gate Charge vs Gate to Source Voltage

TO-220 _ PACKGE OUTLIN



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.320	4.826	0.170	0.190
B1	1.143	1.778	0.045	0.070
b	0.610	0.910	0.024	0.036
c	0.356	0.530	0.014	0.021
c1	0.45	0.61	0.018	0.024
D	14.224	16.510	0.560	0.650
E	9.652	10.668	0.380	0.420
e	2.540 BSC		0.100 BSC	
e1	5.080 BSC		0.200 BSC	
F	1.220	1.397	0.048	0.055
H1	5.842	6.858	0.230	0.270
J1	2.032	2.921	0.080	0.115
L	12.700	14.732	0.500	0.580
L1	3.400	4.000	0.134	0.150
L2	2.70	3.20	0.106	0.126
ϕ P	3.530	4.090	0.139	0.161
Q	2.540	3.429	0.100	0.135