

60V N-Channel Power MOSFET

DESCRIPTION :

- Excellent $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% ΔV_{DS} Tested
- Pb-Free Lead Plating
- RoHS compliant
- Halogen Free

V_{DSS}	60V
$I_D @ V_{GS}=10V$	120A
$R_{DS(ON), Typ. @ V_{GS}=10V}$	4.2m Ω



TO-220AB

TYPICAL APPLICATIONS :

- Power Management
- Load Switch
- PWM Application

MAXIMUM RATINGS (at $T_C = 25^\circ\text{C}$, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 25	V
Continuous Drain Current	$T_C=25^\circ\text{C}$ $T_C=100^\circ\text{C}$	I_D	120 76	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	Refer to Fig4	A
Single Pulsed Avalanche Energy ⁽²⁾		E_{AS}	282	mJ
Power dissipation	$T_C=25^\circ\text{C}$ $T_C=100^\circ\text{C}$	P_D	139 56	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

Notes : 1. Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition: Starting $T_J=25^\circ\text{C}$, $V_{DD}=30V$, $V_{GS}=10V$, $R_G=25\text{ohm}$, $L=0.5\text{mH}$, $I_{AS}=33.6A$, $V_{DD}=0V$ during time in avalanche.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	71 0.9	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS (at $T_J = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	60			V
Zero Gate Voltage Drain Current VDS = 60 V, VGS = 0 V	I_{DSS}			1	uA
Gate-Source Leakage Current VGS = ± 25 V, VDS = 0V	I_{GSS}			± 100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	2.1	3.0	4.0	V
Drain-Source On-State Resistance VGS = 10V, ID = 30A	$R_{DS(on)}$		4.2	6.0	m Ω
Input capacitance f=1MHz, VDS=30 V, VGS=0 V	C_{iss}		5163	6970	pF
Output capacitance f=1MHz, VDS=30 V, VGS=0 V	C_{oss}		370	500	pF
Reverse transfer capacitance f=1MHz, VDS=30 V, VGS=0 V	C_{rss}		327	442	pF
Gate Resistance f=1MHz	R_g		1.1		Ω
Total Gate Charge VDS= 30V, ID= 30A, VGS= 0 to 10V	Q_G		112	151	nC
Gate to Source Charge VDS= 30V, ID= 30A, VGS= 0 to 10V	Q_{GS}		31	41	nC
Gate to Drain Charge VDS= 30V, ID= 30A, VGS= 0 to 10V	Q_{GD}		39	53	nC
Turn-on delay time VDD=30 V, VGS= 10V, ID= 30A, RGEN=3 Ω	$t_{d(ON)}$		20		ns
Rise time VDD=30 V, VGS= 10V, ID= 30A, RGEN=3 Ω	t_r		43		ns
Turn-off delay time VDD=30 V, VGS= 10V, ID= 30A, RGEN=3 Ω	$t_{d(OFF)}$		53		ns
Fall time VDD=30 V, VGS= 10V, ID= 30A, RGEN=3 Ω	t_f		23		ns

Body Diode

ELECTRICAL CHARACTERISTICS (at $T_J = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage $V_{GS} = 0V, I_S = 30A$	V_{SD}			1.2	V
Maximum Continuous Body Diode Forward Current	I_S			120	A
Maximum Pulsed Body Diode Forward Current	I_{SM}			480	A
Revers Recovery Time $I_F = 30A, di/dt = 100A/\mu s$	T_{rr}		28	37	ns
Revers Recovery Charge $I_F = 30A, di/dt = 100A/\mu s$	Q_{rr}		31		nC

Typical Performance Characteristics

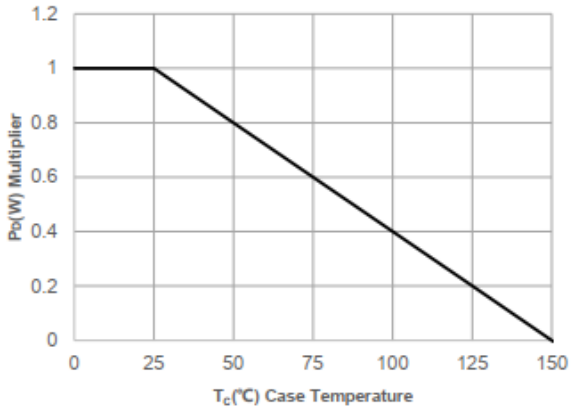


Figure 1. Power De-rating

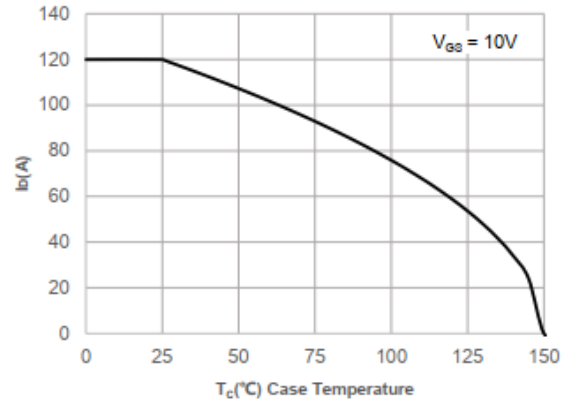


Figure 2. Current De-rating

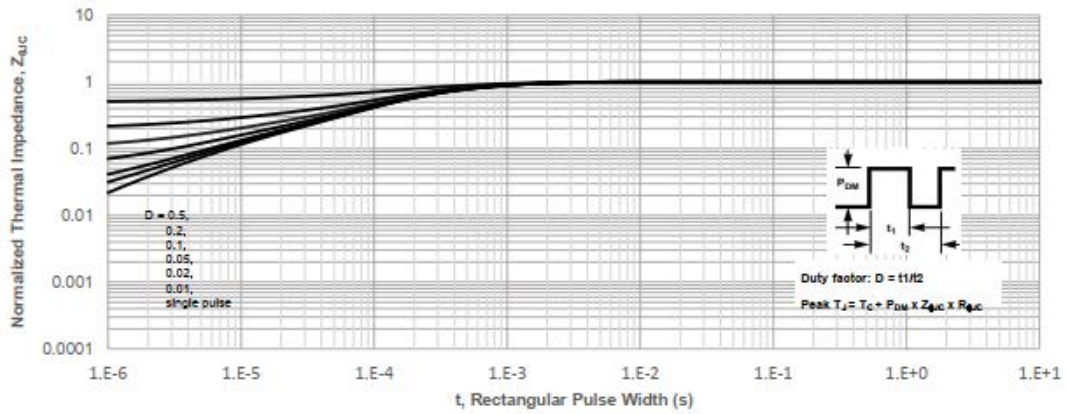


Figure 3. Normalized Maximum Transient Thermal Impedance

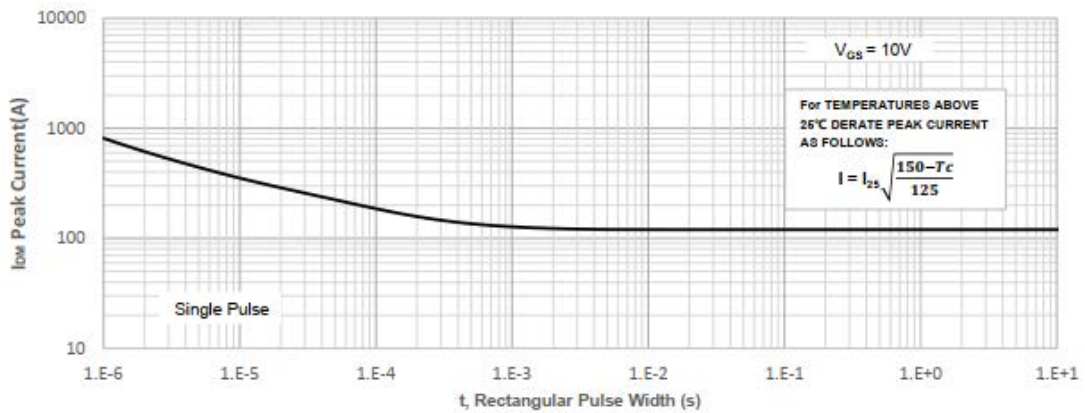


Figure 4. Peak Current Capacity

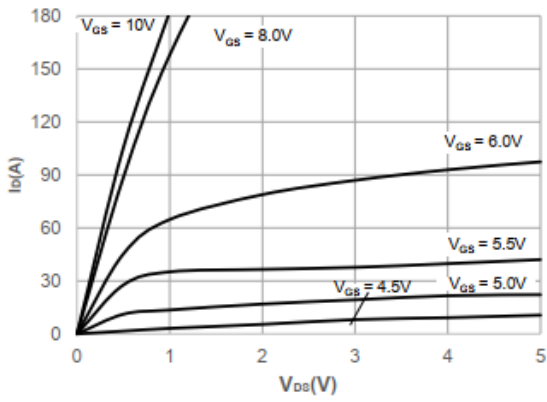


Figure 5. Output Characteristics

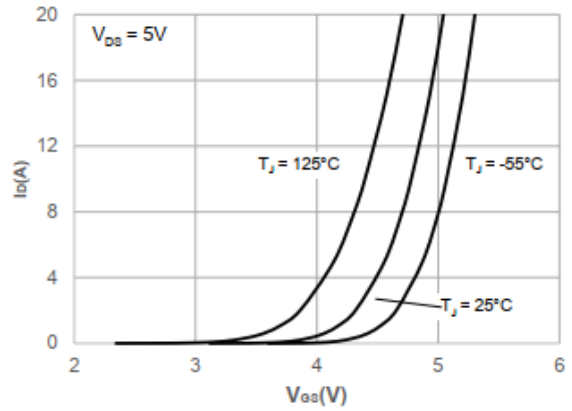


Figure 6. Typical Transfer Characteristics

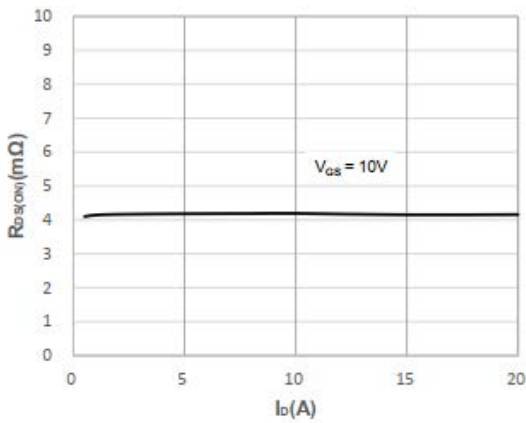


Figure 7. On-resistance vs. Drain Current

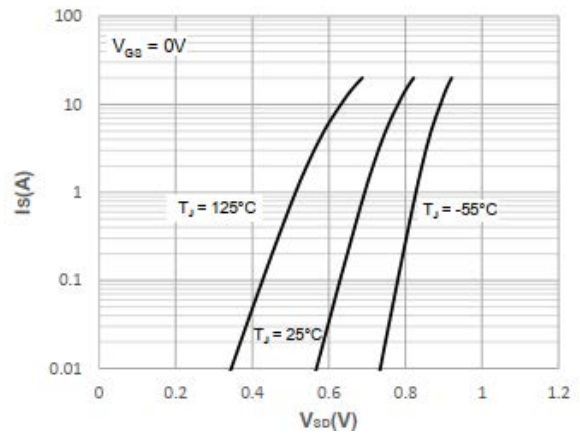


Figure 8. Body Diode Characteristics

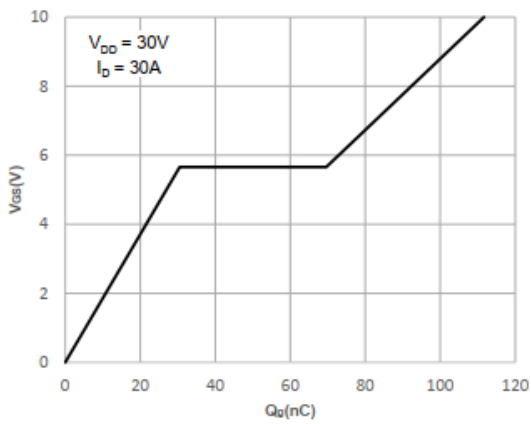


Figure 9. Gate Charge Characteristics

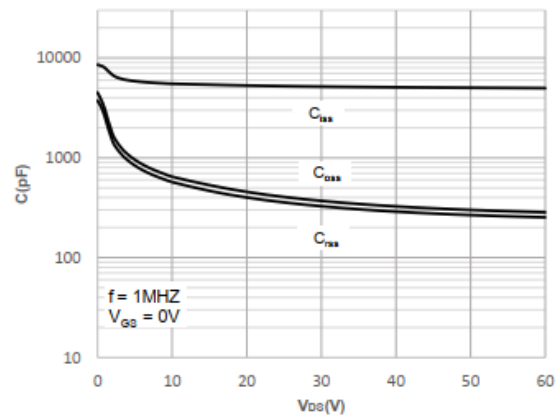


Figure 10. Capacitance Characteristics

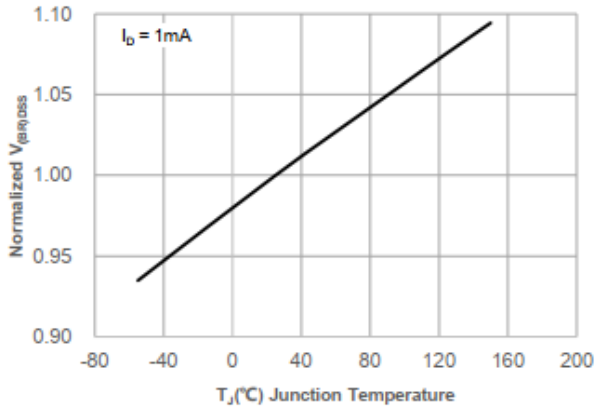


Figure 11. Normalized Breakdown voltage vs. Junction Temperature

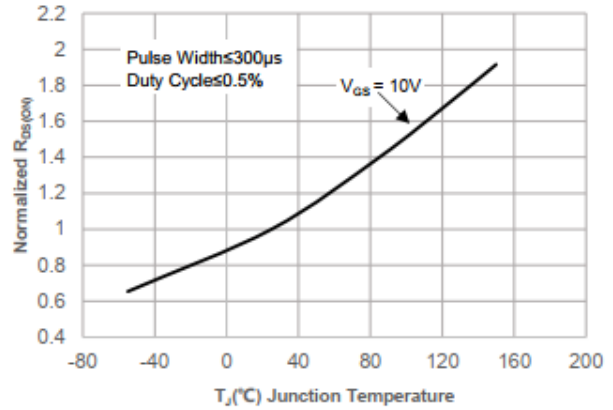


Figure 12. Normalized on Resistance vs. Junction Temperature

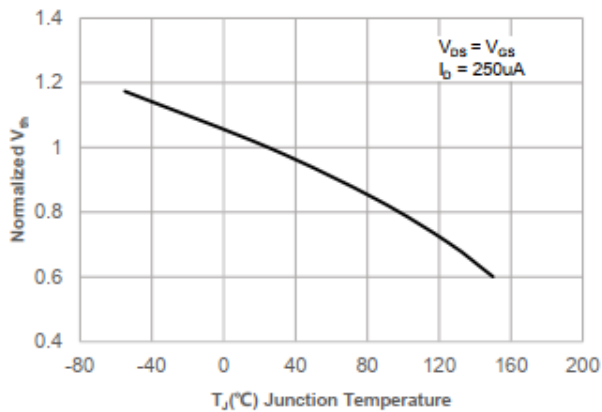


Figure 13. Normalized Threshold Voltage vs. Junction Temperature

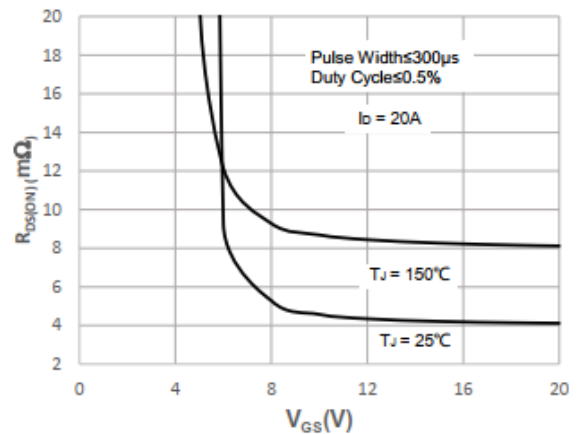


Figure 14. $R_{DS(ON)}$ vs. V_{GS}

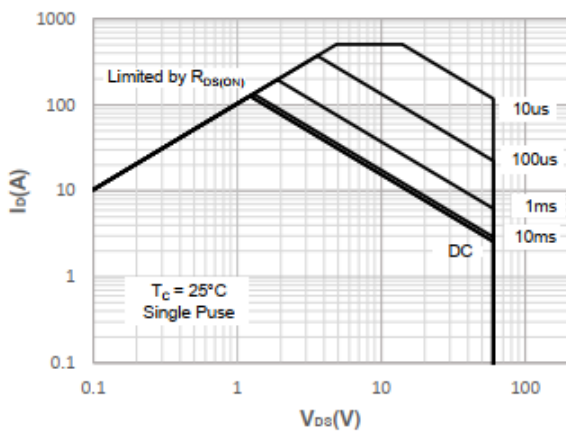
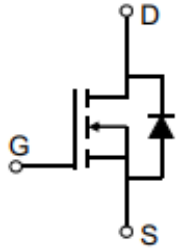
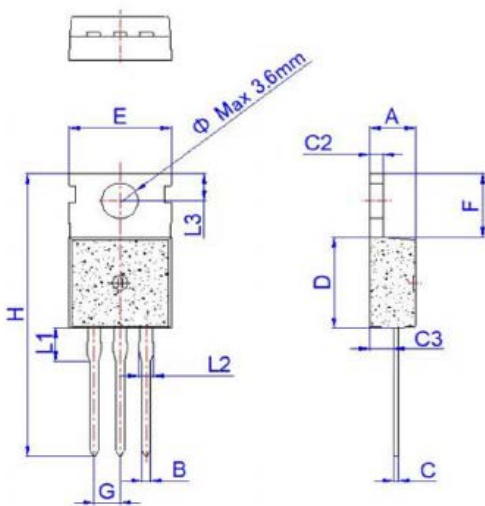


Figure 15. Maximum Safe Operating Area

- Circuit diagram



- Package outlines : Dimensions in (mm)



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	

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