

## 150V N-Channel Power MOSFET

### DESCRIPTION :

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

$V_{DSS}$	150V
$I_D @ V_{GS}=10V$	84A
$R_{DS(ON\_Typ. @ V_{GS}=10V}$	8.1m $\Omega$

### TYPICAL APPLICATIONS :

- Load Switch
- PWM Application
- Power Management



TO-220AB

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	150	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_c=25^\circ\text{C}$ $T_c=100^\circ\text{C}$	$I_D$	84 59	A
Pulsed Drain Current <sup>(1)</sup>		$I_{DM}$	Refer to Fig.4	A
Single Pulsed Avalanche Energy <sup>(2)</sup>		EAS	536	mJ
Power dissipation	$T_c=25^\circ\text{C}$ $T_c=100^\circ\text{C}$	$P_D$	170 68	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. EAS condition: Starting  $T_J=25^\circ\text{C}$ ,  $V_{DD}=75\text{V}$ ,  $V_G=10\text{V}$ ,  $R_G=25\text{ohm}$ ,  $L=3\text{mH}$ ,  $I_{AS}=18.9\text{A}$ ,  $V_{DD}=0\text{V}$  during time in avalanche.

## THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	28 0.7	$^{\circ}C/W$

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0V, I_D = 250\mu A$	$V_{(BR)DSS}$	150			V
Zero Gate Voltage Drain Current $V_{DS} = 120V, V_{GS} = 0V, T_J = 25^{\circ}C$	$I_{DSS}$			1	$\mu A$
Gate-Source Leakage Current $V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$			$\pm 100$	nA
Gate-Source threshold voltage $V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(th)}$	2.2	3.2	4.1	V
Drain-Source On-State Resistance $V_{GS} = 10V, I_D = 20A$	$R_{DS(on)}$		8.1	10.6	m $\Omega$
Input capacitance $f=1MHz, V_{DS}=75V, V_{GS}=0V$	$C_{iss}$		3569		pF
Output capacitance $f=1MHz, V_{DS}=75V, V_{GS}=0V$	$C_{oss}$		323		pF
Reverse transfer capacitance $f=1MHz, V_{DS}=75V, V_{GS}=0V$	$C_{rss}$		14		pF
Gate Resistance $f=1MHz$	$R_g$		3.7		$\Omega$
Total Gate Charge $V_{DS}= 75V, I_D= 20A, V_{GS}=0$ to 10V	$Q_G$		53		nC
Gate to Source Charge $V_{DS}= 75V, I_D= 20A, V_{GS}=0$ to 10V	$Q_{GS}$		19		nC
Gate to Drain Charge $V_{DS}= 75V, I_D= 20A, V_{GS}=0$ to 10V	$Q_{GD}$		12		nC

## Body Diode

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Turn-on delay time VDD= 75V, VGS= 10V, $I_D=3\Omega$ , $R_{GEN}=3\Omega$	$t_{d(ON)}$		16		ns
Rise time VDD= 75V, VGS= 10V, $I_D=3\Omega$ , $R_{GEN}=3\Omega$	tr		29		ns
Turn-off delay time VDD= 75V, VGS= 10V, $I_D=3\Omega$ , $R_{GEN}=3\Omega$	$t_{d(OFF)}$		39		ns
Fall time VDD= 75V, VGS= 10V, $I_D=3\Omega$ , $R_{GEN}=3\Omega$	tf		16		ns
Maximum Continuous Body Diode Forward Current	$I_S$			84	A
Maximum Pulsed Body Diode Forward Current	$I_{SM}$			336	A
Body Diode Forward Voltage VGS = 0V, $I_S = 20A$	$V_{SD}$			1.2	V
Revers Recovery Time $I_F=15A$ , $di/dt = 100A/us$	$T_{rr}$		85		ns
Revers Recovery Charge $I_F=15A$ , $di/dt = 100A/us$	Qrr		253		nC

Typical Performance Characteristics

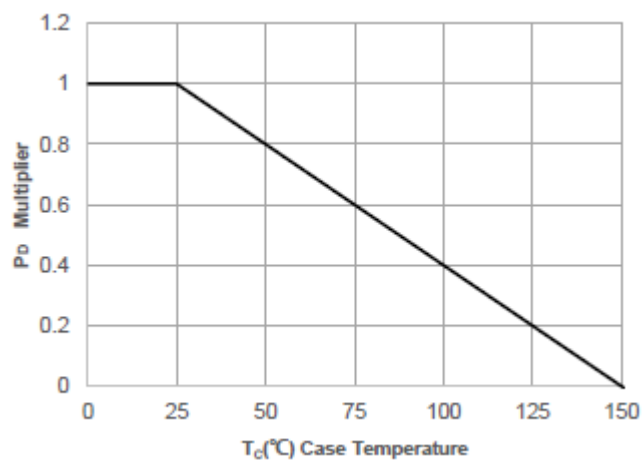


Figure 1. Power De-rating

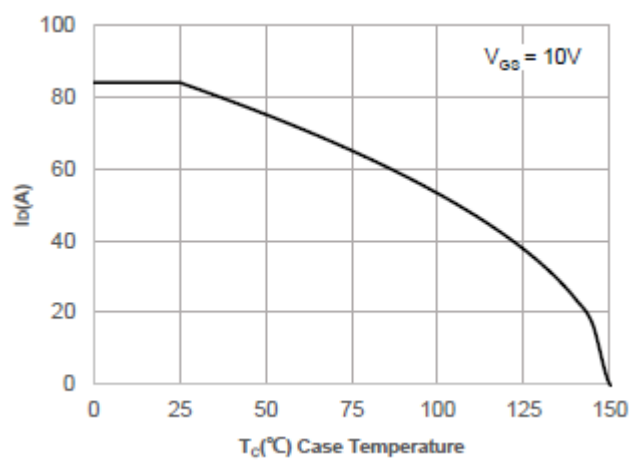


Figure 2. Current De-rating

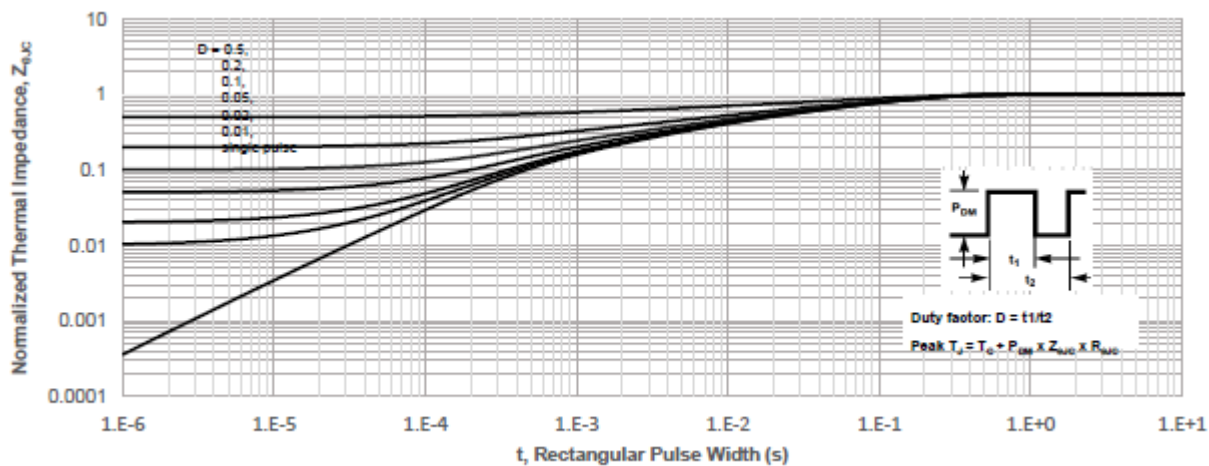


Figure 3. Normalized Maximum Transient Thermal Impedance

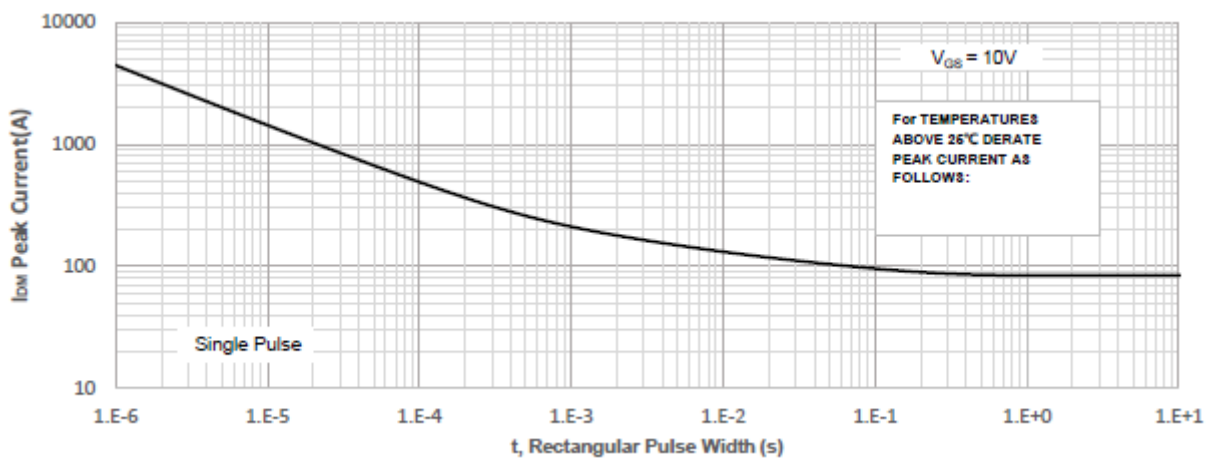


Figure 4. Peak Current Capacity

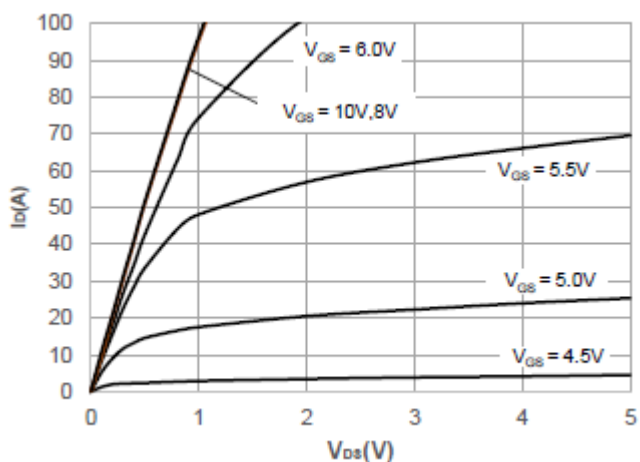


Figure 5. Output Characteristics

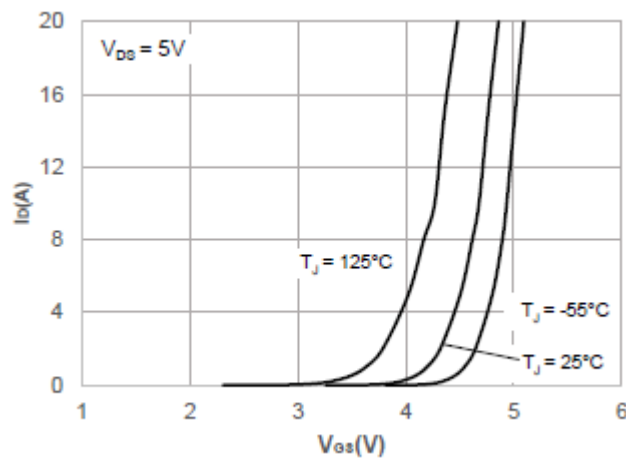


Figure 6. Typical Transfer Characteristics

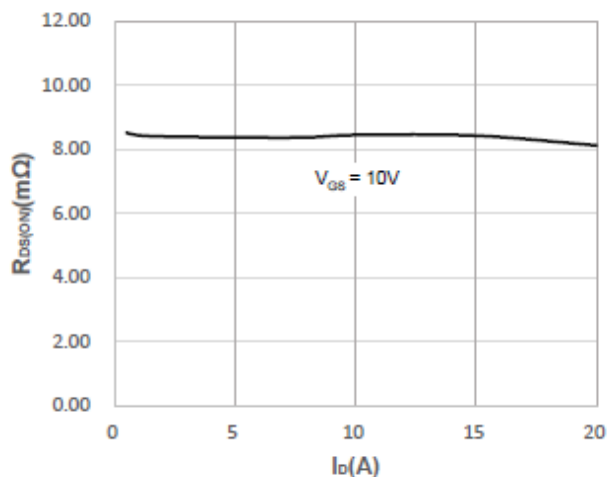


Figure 7. On-resistance vs. Drain Current

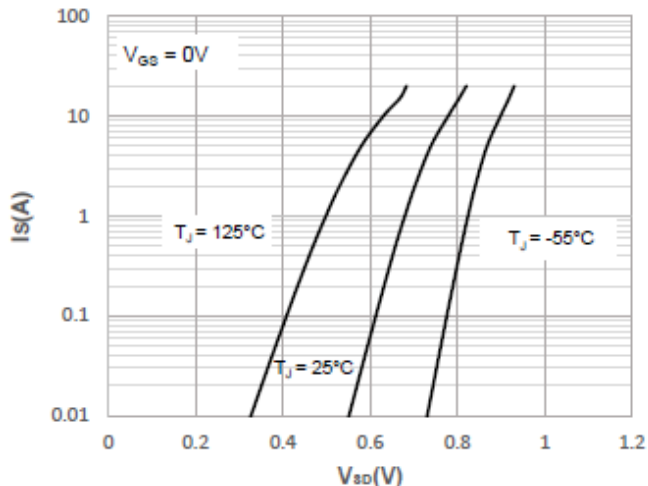


Figure 8. Body Diode Characteristics

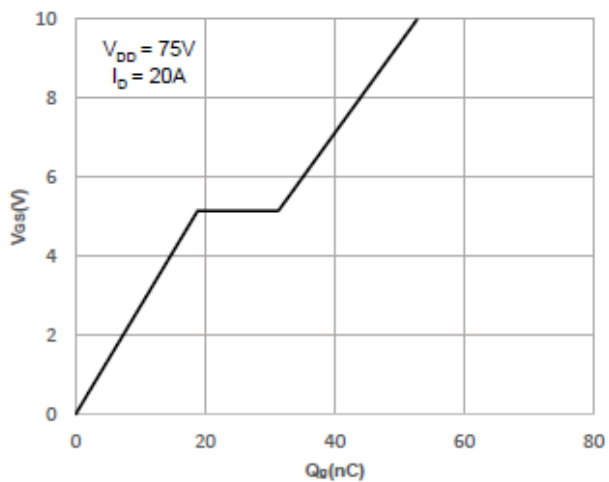


Figure 9. Gate Charge Characteristics

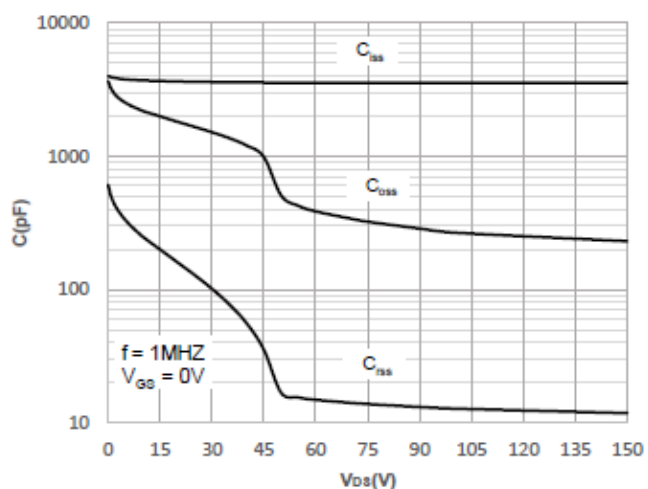


Figure 10. Capacitance Characteristics

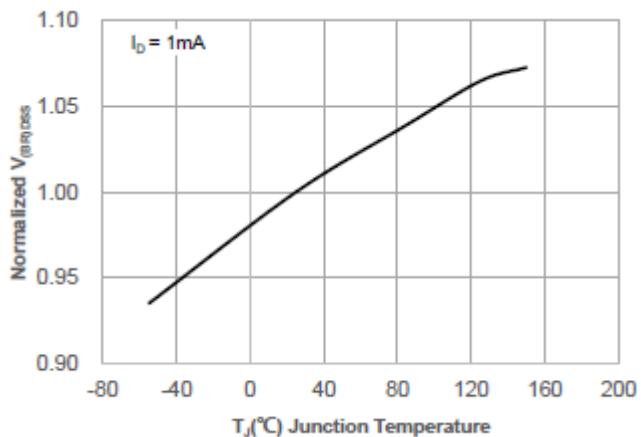


Figure 11. Normalized Breakdown voltage vs. Junction Temperature

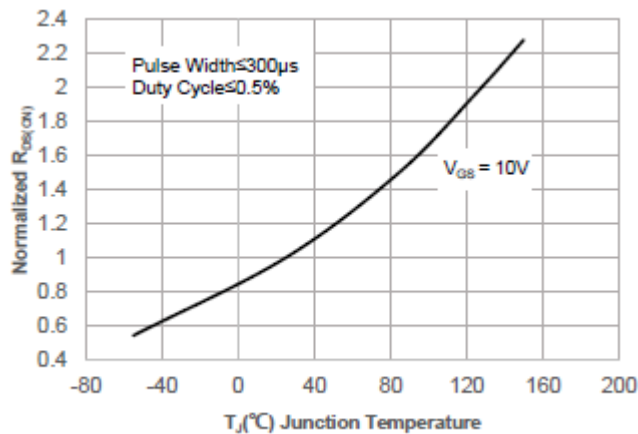


Figure 12. Normalized on Resistance vs. Junction Temperature

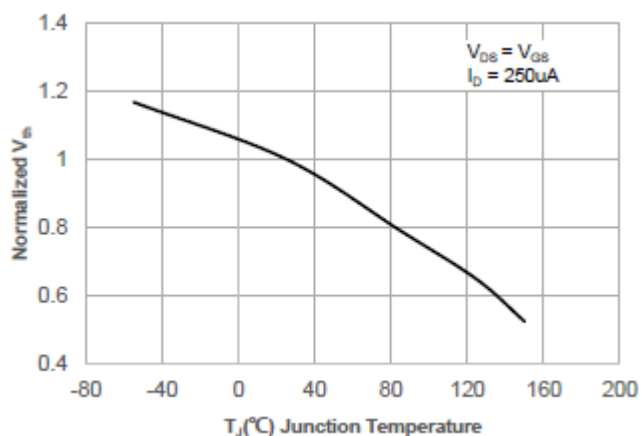


Figure 13. Normalized Threshold Voltage vs. Junction Temperature

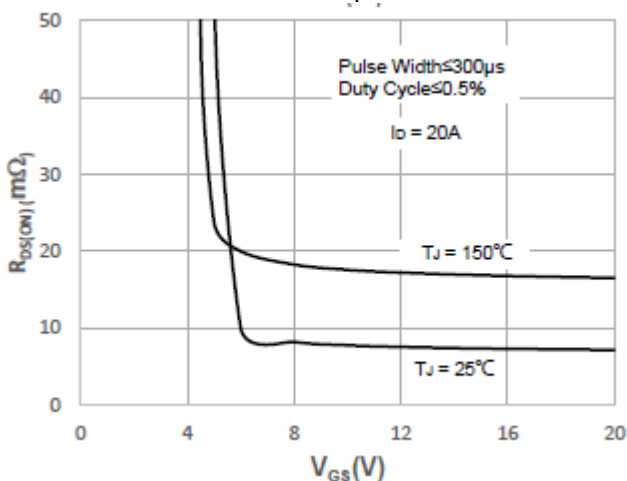


Figure 14. R\_DS(ON) vs. V\_GS

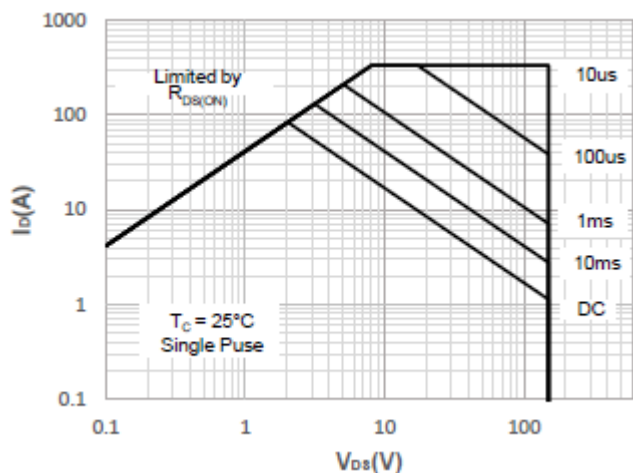
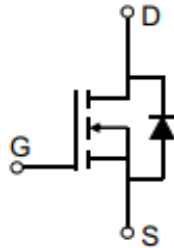
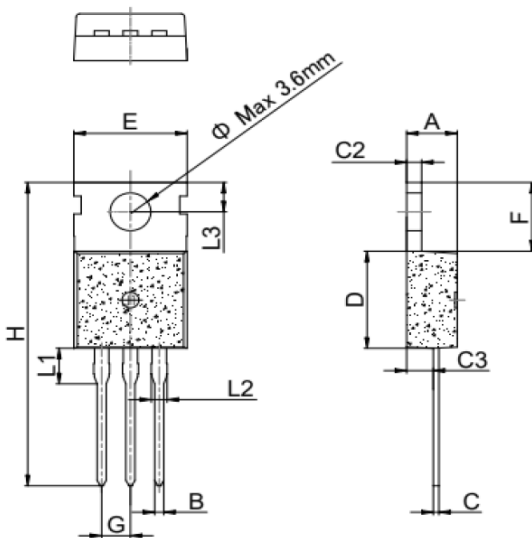


Figure 15. Maximum Safe Operating Area

·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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