

100V N-Channel Power MOSFET

DESCRIPTION :

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% Rg Tested
- Fast Recovery Body Diode
- RoHS compliant
- Pb-Free Lead Plating

V_{DS}	100V
$I_D @ V_{GS} = 10V$	134A
$R_{DS(ON_Typ.) @ V_{GS} = 10V}$	3.7m Ω

TYPICAL APPLICATIONS :

- Power Management
- Current Switching in DC/DC & AC/DC (SR) Sub-system
- Motor Driving in Power Tool, E-vehicle, Robotics



TO-220AB

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_c = 25^\circ\text{C}$ $T_c = 100^\circ\text{C}$	I_D	134 85	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	411	A
Avalanche Energy ⁽²⁾		I_{AS}	45	A
Avalanche Energy ⁽²⁾		E_{AS}	304	mJ
Power dissipation	$T_c = 25^\circ\text{C}$ $T_c = 100^\circ\text{C}$	P_D	156 63	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. This single-pulse measurement was taken under the following condition [$L = 300\text{mH}$, $V_{GS} = 10\text{V}$, $V_{DS} = 50\text{V}$] while its value is limited by $T_{J_Max} = 150^\circ\text{C}$.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	55 0.8	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0V, I_D = 250\mu A$	$V_{(BR)DSS}$	100			V
Zero Gate Voltage Drain Current $V_{DS} = 80V, V_{GS} = 0V$	I_{DSS}			1	μA
Gate-Source Leakage Current $V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}			± 100	nA
Gate-Source threshold voltage $V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(th)}$	2.0	2.7	4.0	V
Drain-Source On-State Resistance $V_{GS} = 10V, I_D = 20A$	$R_{DS(on)}$		3.9	4.7	m Ω
Forward Transconductance $V_{DS} = 5V, I_D = 20A$	G_{FS}		106		S
Input capacitance $f = 1MHz, V_{DS} = 50V, V_{GS} = 0V$	C_{iss}		3433		pF
Output capacitance $f = 1MHz, V_{DS} = 50V, V_{GS} = 0V$	C_{oss}		905		pF
Reverse transfer capacitance $f = 1MHz, V_{DS} = 50V, V_{GS} = 0V$	C_{rss}		13		pF
Gate Resistance $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$	R_g		2.1		Ω
Total Gate Charge $V_{DS} = 50V, I_D = 20A, V_{GS} = 10V$ $V_{DS} = 50V, I_D = 20A, V_{GS} = 6.0V$	Q_G		57 38		nC
Gate to Source Charge $V_{DS} = 50V, I_D = 20A, V_{GS} = 0$ to 10V	Q_{GS}		11		nC
Gate to Drain Charge $V_{DS} = 50V, I_D = 20A, V_{GS} = 0$ to 10V	Q_{GD}		16.1		nC
Turn-on delay time $V_{DS} = 50V, V_{GS} = 10V, R_L = 2.5\Omega, R_{GEN} = 6\Omega$	$t_{d(ON)}$		14.1		ns
Rise time $V_{DS} = 50V, V_{GS} = 10V, R_L = 2.5\Omega, R_{GEN} = 6\Omega$	t_r		34		ns
Turn-off delay time $V_{DS} = 50V, V_{GS} = 10V, R_L = 2.5\Omega, R_{GEN} = 6\Omega$	$t_{d(OFF)}$		60		ns
Fall time $V_{DS} = 50V, V_{GS} = 10V, R_L = 2.5\Omega, R_{GEN} = 6\Omega$	t_f		50		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 $V_{GS} = 0V, I_S = 1A$	V_{SD}		0.71	1.0	V
Diode Continuous Current, $T_c=25^\circ\text{C}$	I_S			156	A
Revers Recovery Time $I_F=15A, dI_F/dt = 100A/us$	T_{rr}		60		ns
Revers Recovery Charge $I_F=15A, dI_F/dt = 100A/us$	Q_{rr}		63		nC

Typical Performance Characteristics

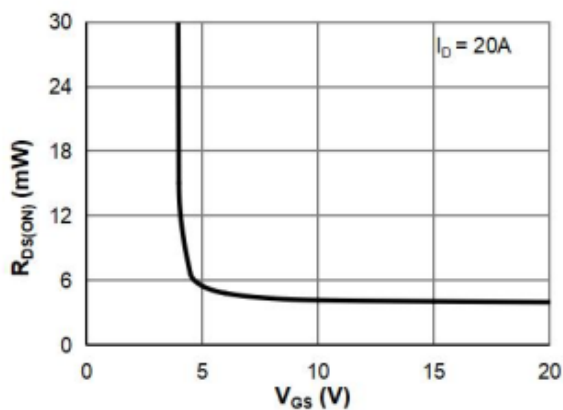


Figure 1. $R_{DS(ON)}$ vs. V_{GS}

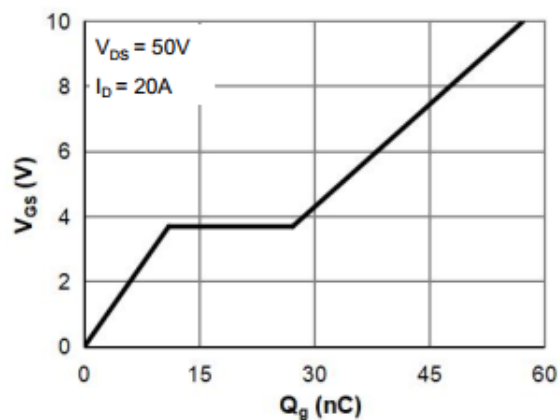


Figure 2. Gate Charge Characteristics

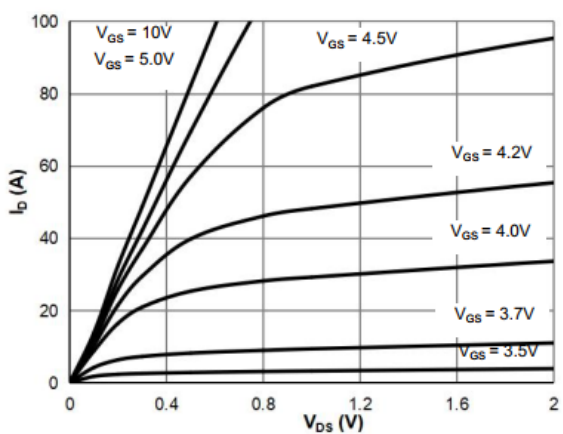


Figure 3. Saturation Characteristics

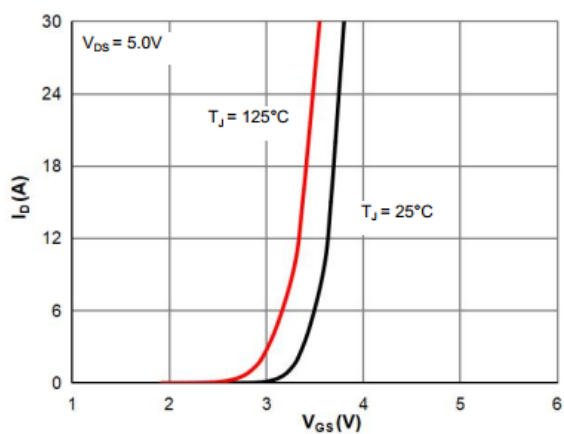


Figure 4. Transfer Characteristics

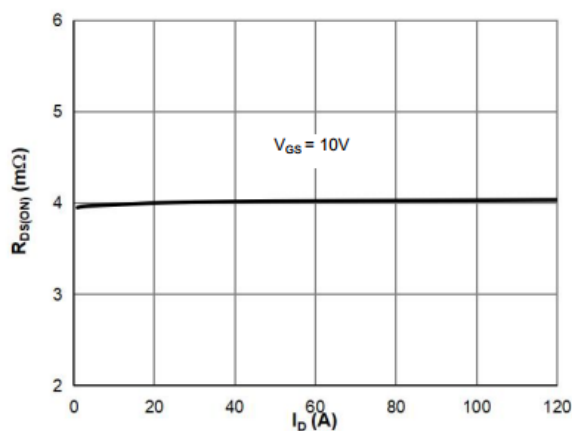


Figure 5. On-resistance vs. Drain Current

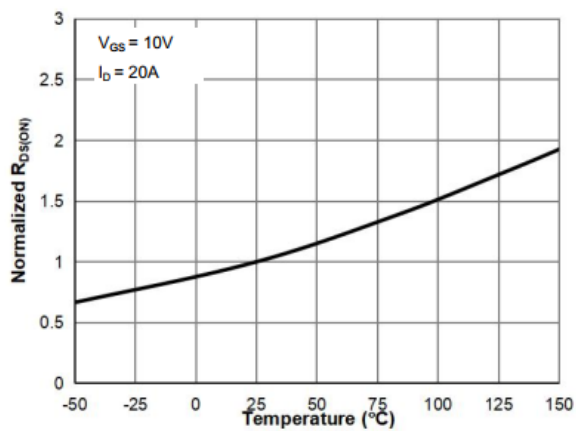


Figure 6. $R_{DS(ON)}$ vs. Junction Temperature

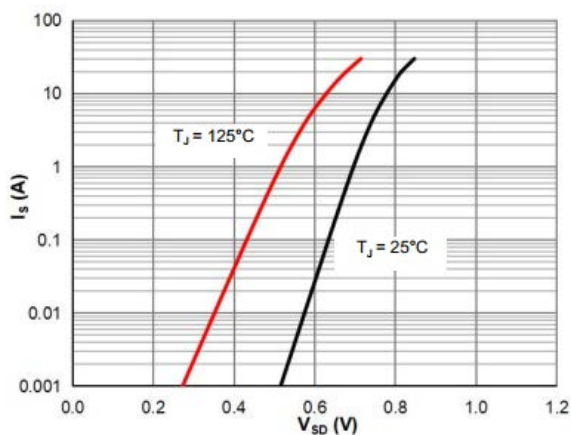


Figure 7. Body-Diode Characteristics

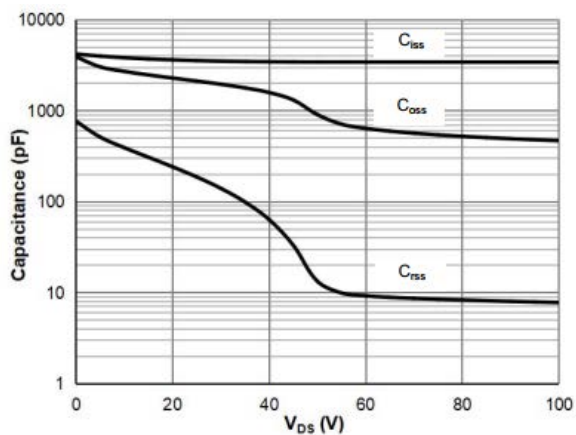


Figure 8. Capacitance Characteristics

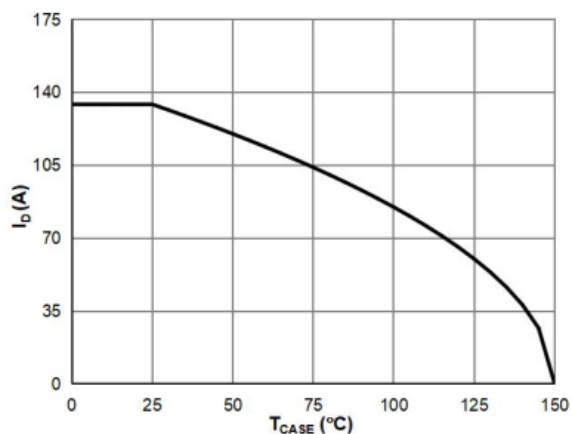


Figure 9. Current De-rating

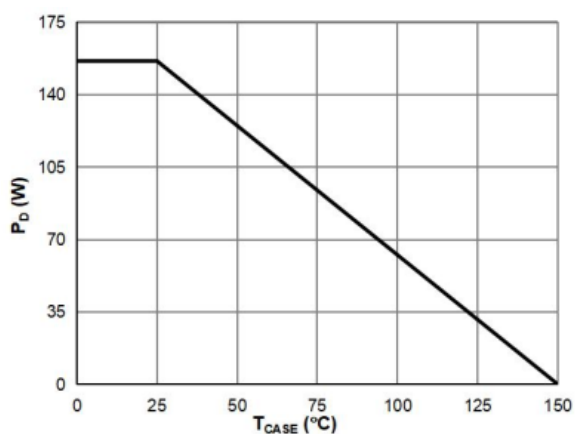


Figure 10. Power De-rating

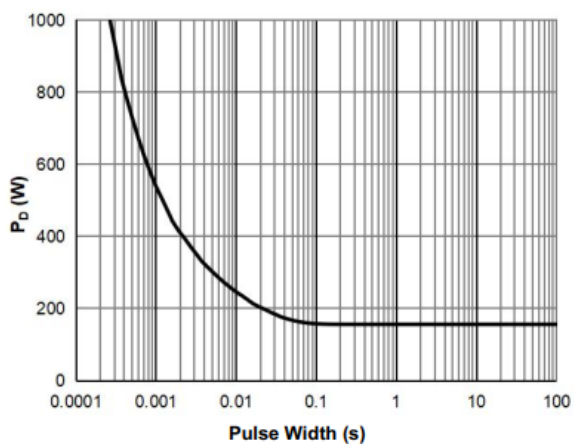


Figure 11. Single Pulse Power Rating, Junction-to-Case

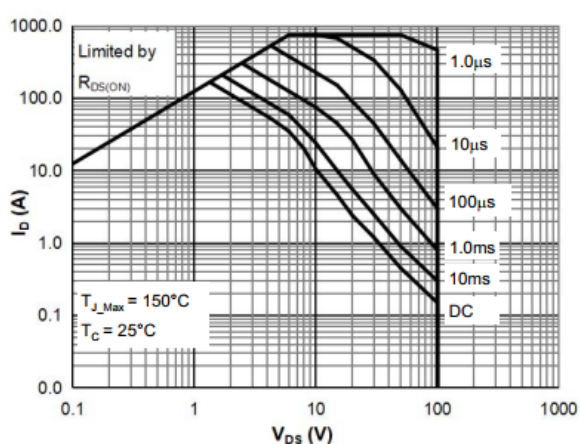


Figure 12. Maximum Safe Operating Area

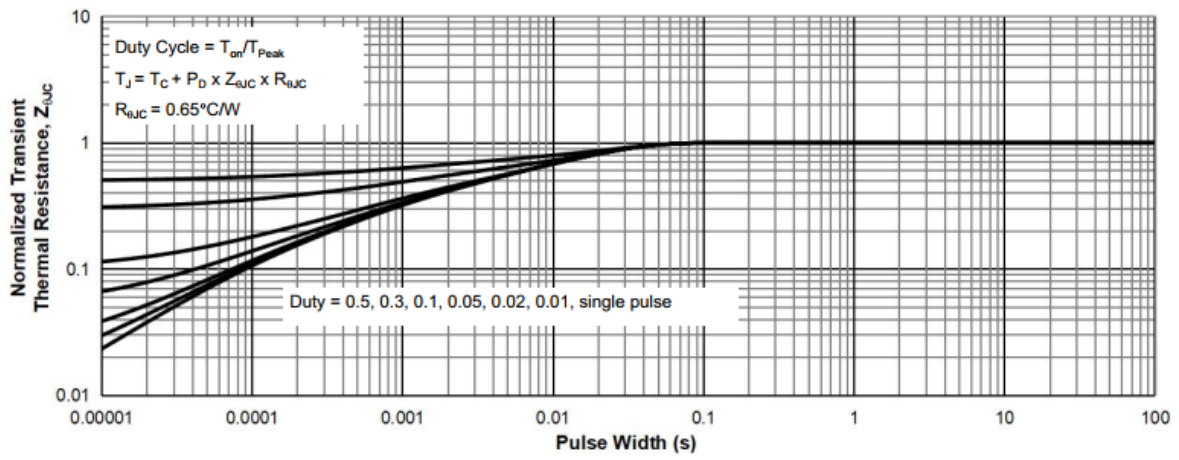
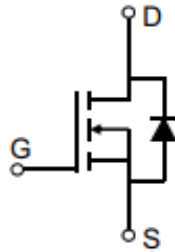
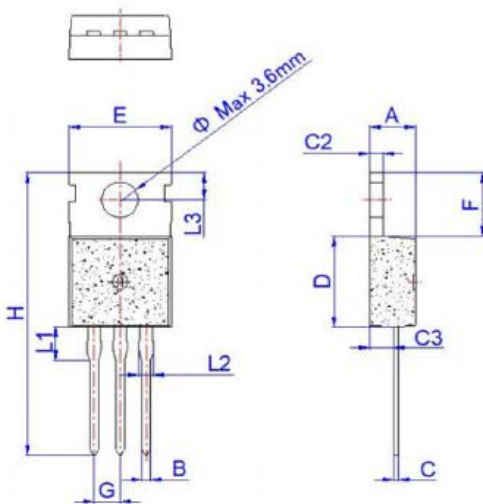


Figure 14. Normalized Maximum Transient Thermal Impedance

- 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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