80V 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}	80V
I_D @V_{GS}=10V	126A
$R_{DS(ON)\_Typ.}$ @V_{GS}=10V	4.5mΩ

TO-220AB

TYPICAL APPLICATIONS：

- Power Management
- Current Switching in DC/DC & AC/DC (SR) Sub-system
- Load Switching, Quick/Wireless Charging, Motor Driving

MAXIMUM RATINGS (at T_A = 25 °C, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	Tc=25℃ Tc=100℃	I_D	126 79	A
Pulsed Drain Current (1)		I_{DM}	508	A
Avalanche Energy (2)		E_{AS}	396	mJ
Power dissipation	Tc=25℃ Tc=100℃	P_D	173 69	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} of 396 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = 16.2A, V_{GS} = 10V, V_{DD} = 40V; 100% test at L = 0.1mH, I_{AS} = 56A, T_{J_Max} = 150°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	℃/W

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	80			V
Zero Gate Voltage Drain Current VDS = 64 V, VGS = 0 V	I_{DSS}			1	uA
Gate-Source Leakage Current VGS = ±20V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	2.0	3.0	4.0	V
Drain-Source On-State Resistance VGS = 10V, ID = 20A	$R_{DS(on)}$		4.5	5.7	mΩ
Forward Transconductance VDS = 5V, ID = 20A	$G_{FS)}$		27		S
Input capacitance f=1MHz, VDS=40 V, VGS=0 V	C_{iss}		3503		pF
Output capacitance f=1MHz, VDS=40 V, VGS=0 V	C_{oss}		1048		pF
Reverse transfer capacitance f=1MHz, VDS=40 V, VGS=0 V	C_{rss}		23		pF
Gate Resistance VDS=0 V, VGS= 0V, f=1MHz	R_g		1.5		Ω
Total Gate Charge VDS= 40V, ID= 20A, VGS= 10V VDS= 40V, ID= 20A, VGS= 6.0V	Q_G		51 32		nC
Gate to Source Charge VDS= 40V, ID= 20A, VGS=0 to 10V	Q_{GS}		20		nC
Gate to Drain Charge VDS= 40V, ID= 20A, VGS=0 to 10V	Q_{GD}		10		nC
Turn-on delay time VDS=40 V, VGS= 10V, R_L=2.0Ω, R_{GEN}=3Ω	td $_{(ON)}$		15		ns
Rise time VDS=40 V, VGS= 10V, R_L=2.0Ω, R_{GEN}=3Ω	tr		23		ns
Turn-off delay time VDS=40 V, VGS= 10V, R_L=2.0Ω, R_{GEN}=3Ω	td $_{(OFF)}$		31		ns
Fall time VDS=40 V, VGS= 10V, R_L=2.0Ω, R_{GEN}=3Ω	tf		13		ns

Body Diode

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage VGS = 0V, I_S = 1A	V_{SD}		0.70	1.0	V
Diode Continuous Current, Tc=25℃	I_S			126	A
Revers Recovery Time IF=15A, dI_F/dt = 100A/us	Trr		57		ns
Revers Recovery Charge IF=15A, dI_F/dt = 100A/us	Qrr		91		nC

Typical Performance Characteristics

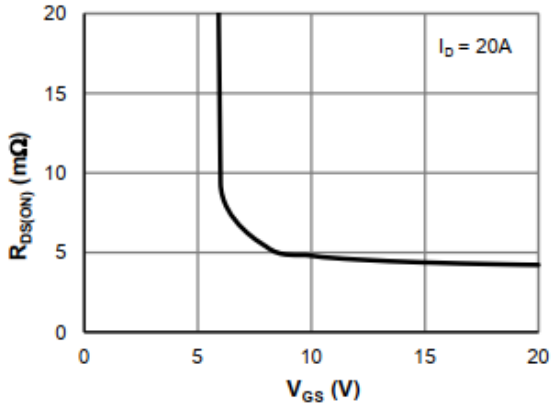


Figure 1. $R_{DS(ON)}$ vs. VGS

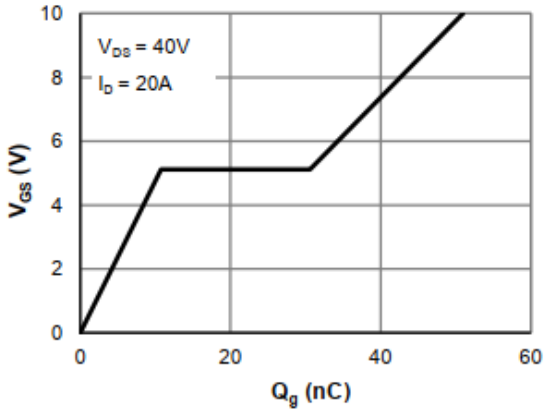


Figure 2. Gate Charge Characteristics

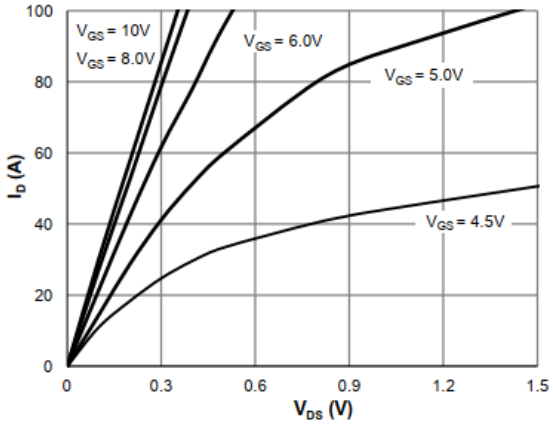


Figure 3. Saturation Characteristics

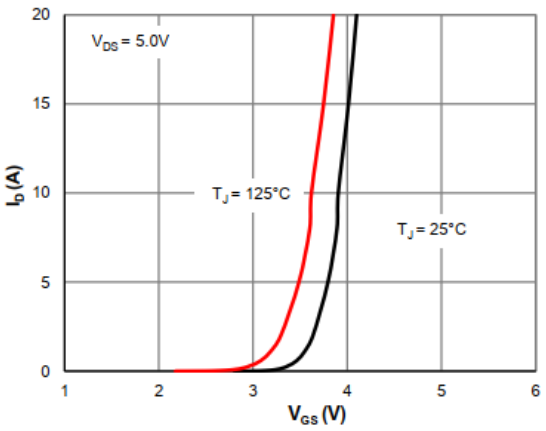


Figure 4. Transfer Characteristics

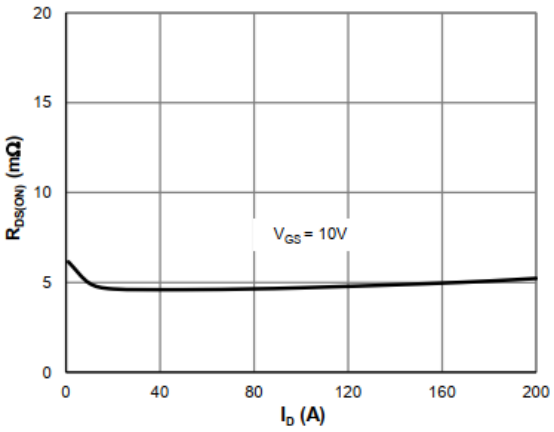


Figure 5. On-resistance vs. Drain Current

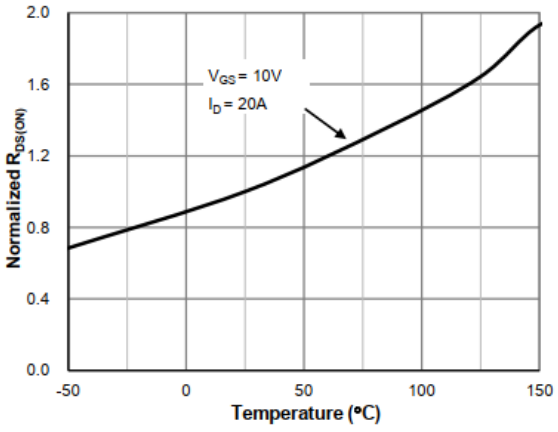


Figure 6. $R_{DS(ON)}$ vs. Junction Temperature

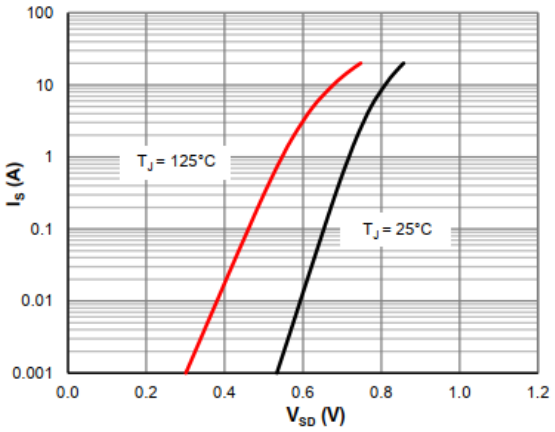


Figure 7. Body-Diode Characteristics

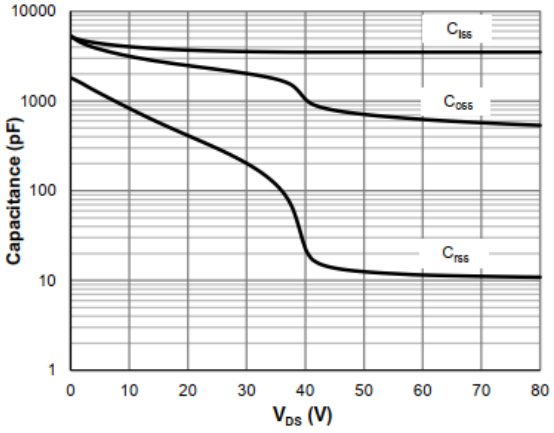


Figure 8. Capacitance Characteristics

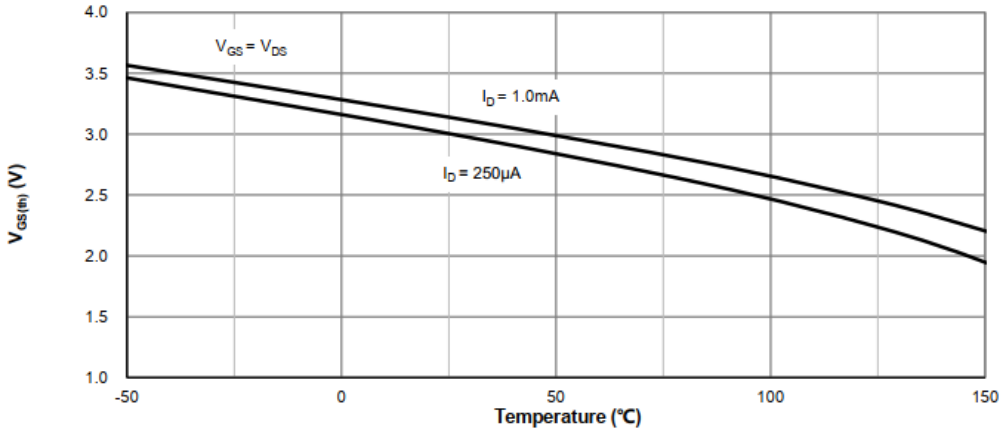


Figure 9. VGS(th) vs. Junction Temperature

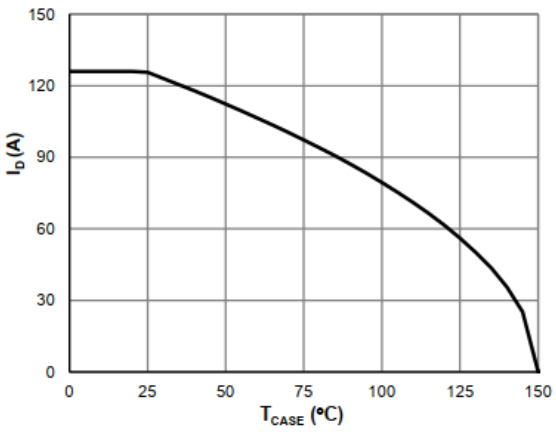


Figure 10. Current De-rating

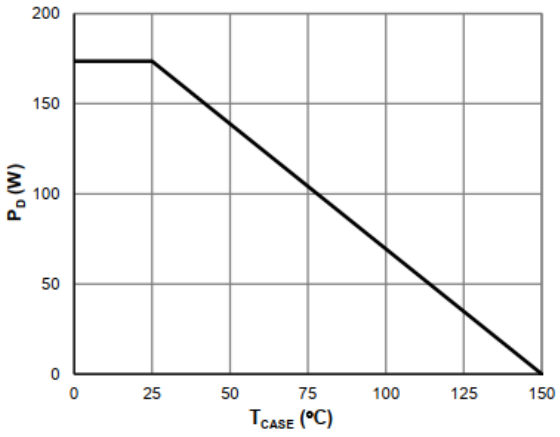


Figure 11. Power De-rating

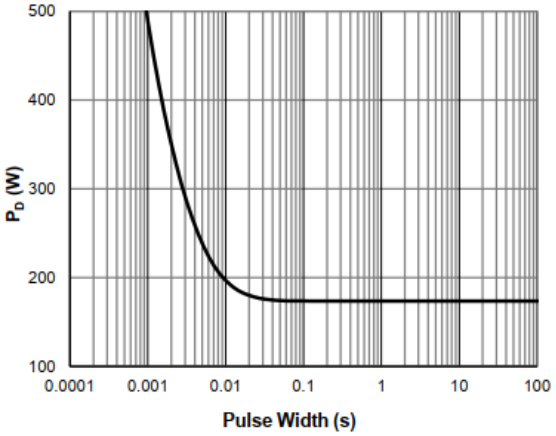


Figure 12. Single Pulse Power Rating, Junction-to-Case

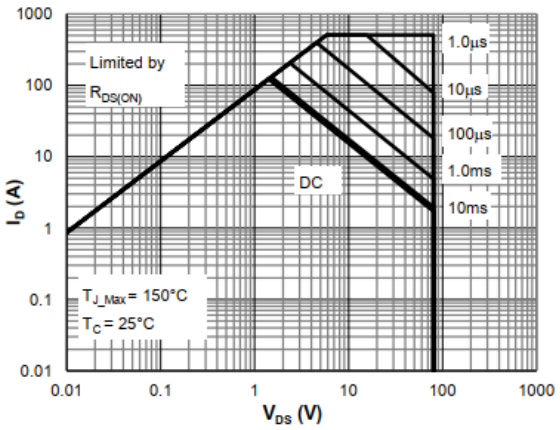


Figure 13. Maximum Safe Operating Area

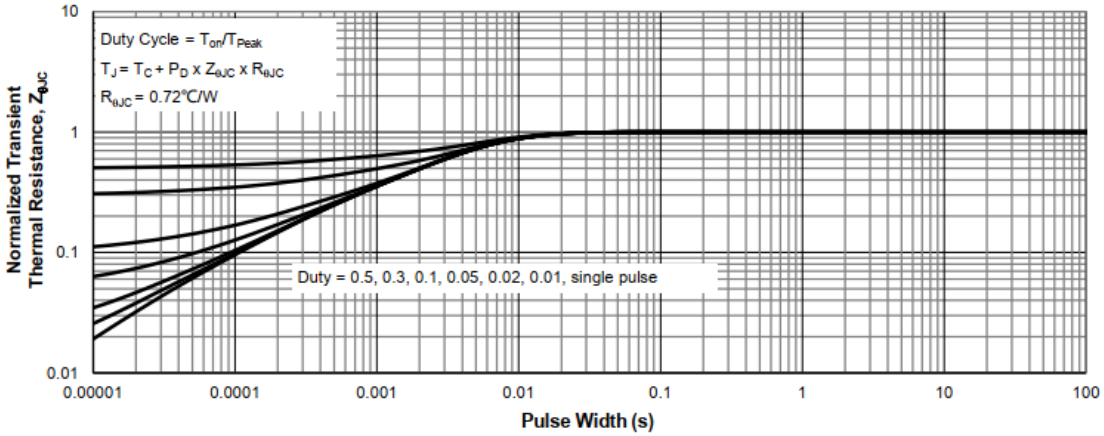
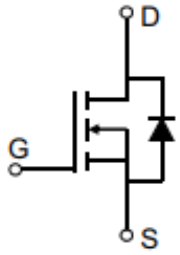
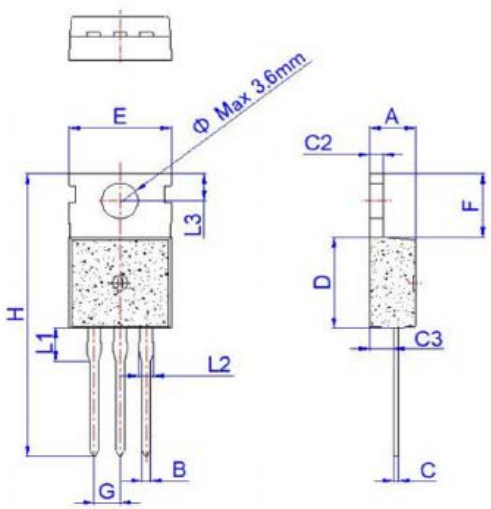


Figure 14. Normalized Maximum Transient Thermal Impedance

・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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