

100V N-Channel Power MOSFET

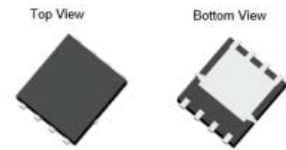
DESCRIPTION :

- Ultra-Low On-Resistance, $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% Rg Tested
- Pb-Free Lead Plating
- RoHS compliant

V_{DS}	60V
$I_D @ V_{GS}=10V$	114A
$R_{DS(ON)_Typ.} @ V_{GS}=10V$	3.2m Ω

TYPICAL APPLICATIONS :

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



PDFN5x6-8L

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	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	114 72	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	411	A
Avalanche Energy ⁽²⁾		E_{AS}	182	mJ
Power dissipation	$T_c=25^\circ\text{C}$ $T_c=100^\circ\text{C}$	P_D	96 38	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} of 182mJ is based on starting $T_J=25^\circ\text{C}$, $L=3.0\text{mH}$, $I_{AS}=11\text{A}$, $V_{GS}=10\text{V}$, $V_{DD}=30\text{V}$: 100% tested at $L=0.3\text{mH}$
 $I_{AS}=25\text{A}$

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	65 1.6	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0V, I_D = 250\mu A$	$V_{(BR)DSS}$	60			V
Zero Gate Voltage Drain Current $V_{DS} = 48V, V_{GS} = 0V$	I_{DSS}			1	μA
Gate-Source Leakage Current $V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}			± 100	nA
Gate-Source threshold voltage $V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(th)}$	1.2	1.8	2.5	V
Drain-Source On-State Resistance $V_{GS} = 10V, I_D = 20A$ $V_{GS} = 4.5V, I_D = 15A$	$R_{DS(on)}$		3.2 4.5	4.2 5.6	m Ω
Forward Transconductance $V_{DS} = 5V, I_D = 20A$	G_{FS}		35		S
Input capacitance $f = 1MHz, V_{DS} = 30V, V_{GS} = 0V$	C_{iss}		2405		pF
Output capacitance $f = 1MHz, V_{DS} = 30V, V_{GS} = 0V$	C_{oss}		1178		pF
Reverse transfer capacitance $f = 1MHz, V_{DS} = 30V, V_{GS} = 0V$	C_{rss}		50		pF
Gate Resistance $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$	R_g		4.3		Ω
Total Gate Charge $V_{DS} = 30V, I_D = 20A, V_{GS} = 10V$	Q_G		39		nC
Gate to Source Charge $V_{DS} = 30V, I_D = 20A, V_{GS} = 0$ to 10V	Q_{GS}		18.7		nC
Gate to Drain Charge $V_{DS} = 30V, I_D = 20A, V_{GS} = 0$ to 10V	Q_{GD}		7.3		nC
Turn-on delay time $V_{DS} = 30V, V_{GS} = 10V, R_L = 1.5\Omega, R_{GEN} = 3\Omega$	$t_{d(ON)}$		8.9		ns
Rise time $V_{DS} = 30V, V_{GS} = 10V, R_L = 1.5\Omega, R_{GEN} = 3\Omega$	t_r		29		ns
Turn-off delay time $V_{DS} = 30V, V_{GS} = 10V, R_L = 1.5\Omega, R_{GEN} = 3\Omega$	$t_{d(OFF)}$		44		ns
Fall time $V_{DS} = 30V, V_{GS} = 10V, R_L = 1.5\Omega, R_{GEN} = 3\Omega$	t_f		22		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}		0.7	1.0	V
Diode Continuous Current, $T_c=25^\circ\text{C}$	I_S			96	A
Revers Recovery Time $I_F=20A, dI_F/dt = 100A/\mu s$	T_{rr}		38		ns
Revers Recovery Charge $I_F=20A, dI_F/dt = 100A/\mu s$	Q_{rr}		28		nC

Typical Performance Characteristics

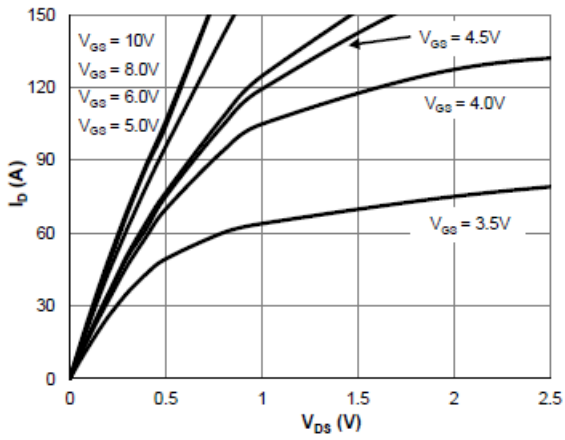


Figure 1. Output Characteristics

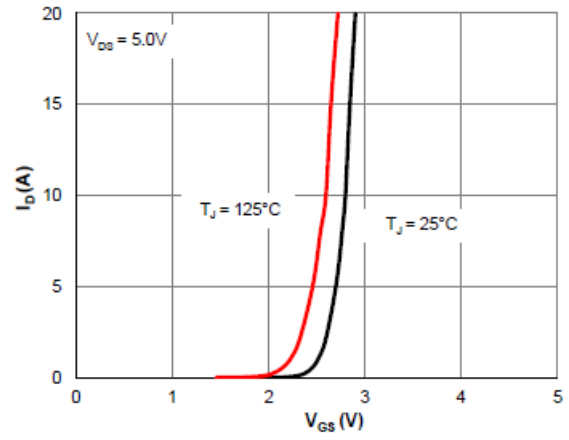


Figure 2. Typical Transfer Characteristics

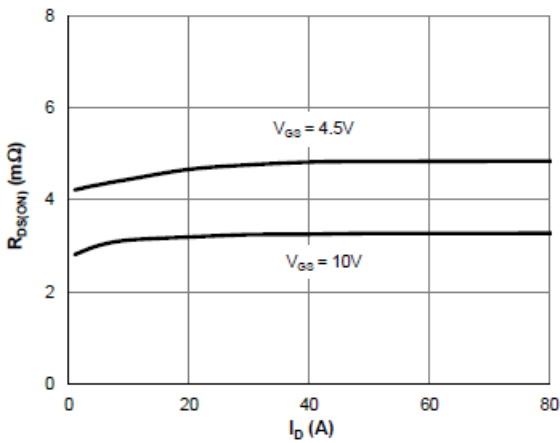


Figure 3. On-resistance vs. Drain Current

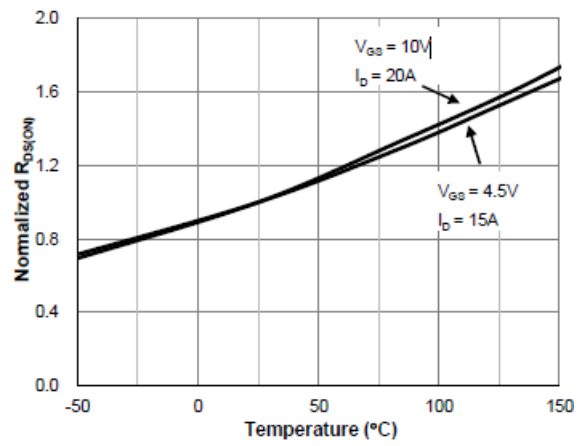


Figure 4. Normalized on Resistance vs. Junction Temperature

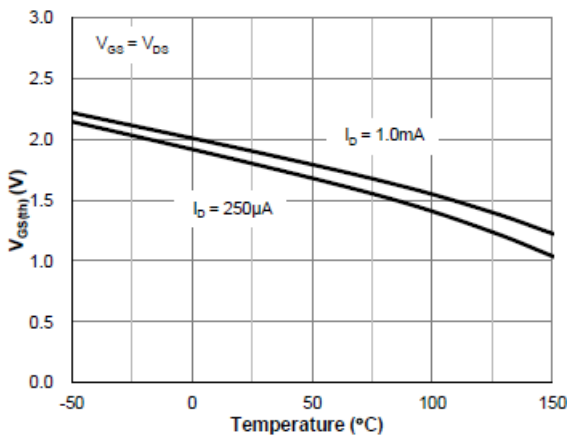


Figure 5. $V_{GS(th)}$ vs. Junction Temperature

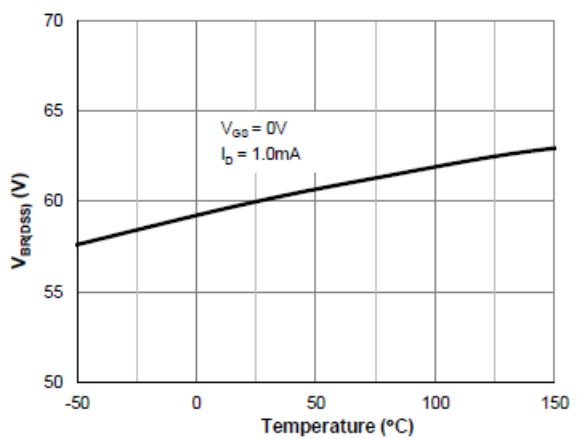


Figure 6. $V_{BR(DSS)}$ vs. Junction Temperature

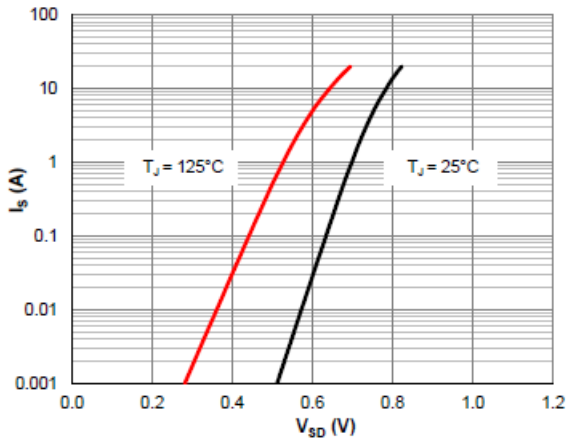


Figure 7. Body Diode Characteristics

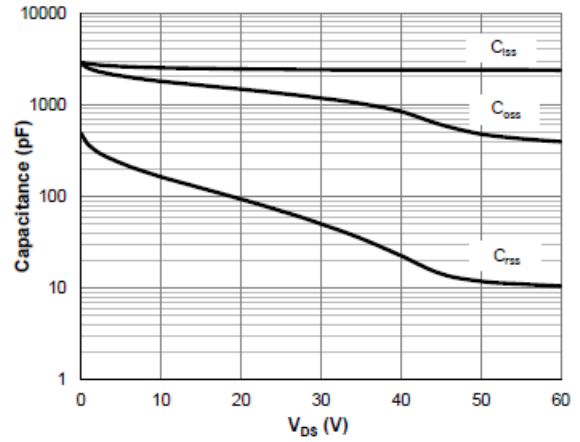


Figure 68 Capacitance Characteristics

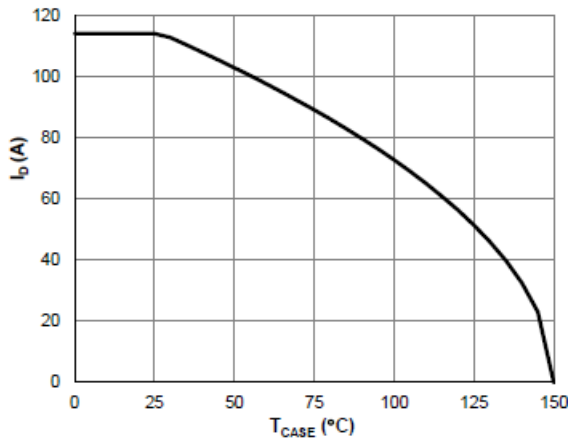


Figure 9. Current De-rating

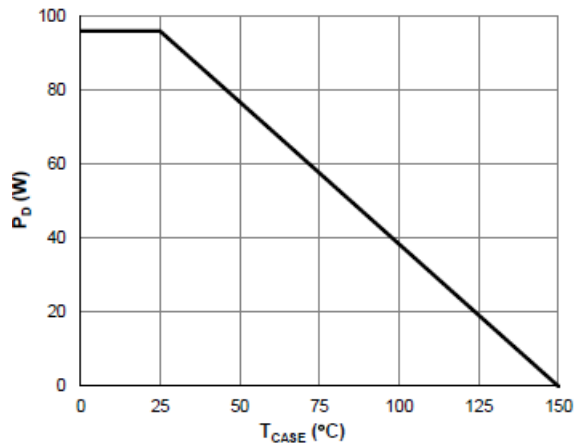


Figure 10. Power De-rating

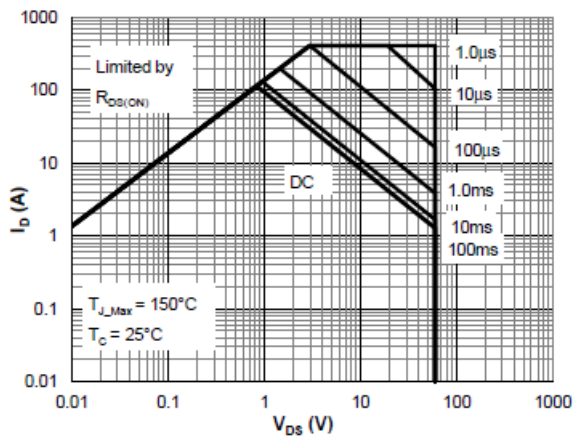


Figure 11. Maximum Safe Operating Area

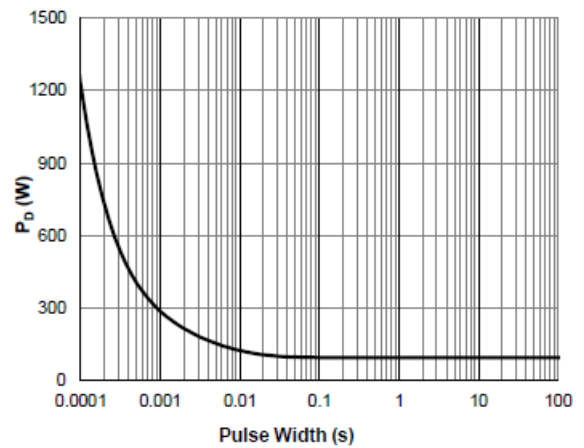


Figure 12. Single Pulse Power Rating, Junction to Case

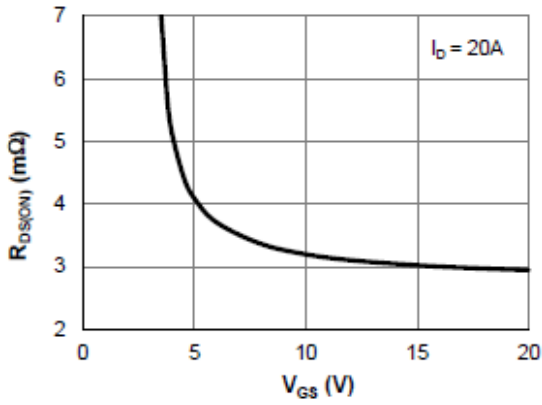


Figure 13. $R_{DS(ON)}$ vs. V_{GS}

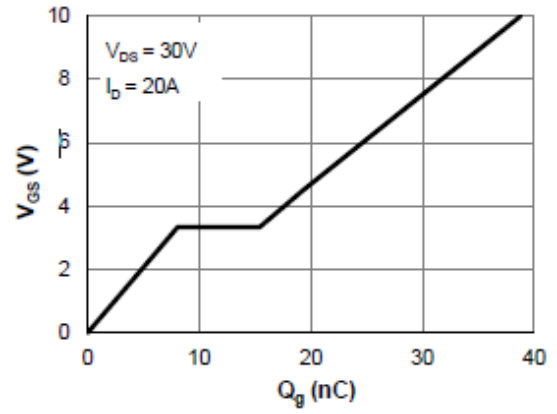


Figure 14. Gate Charge Characteristics

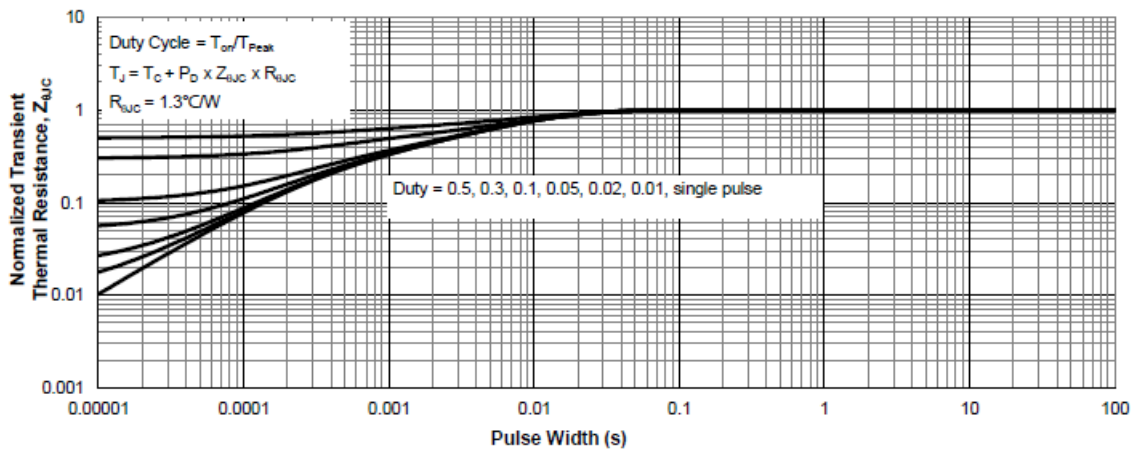
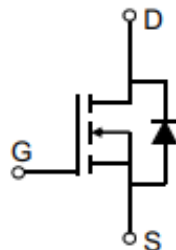
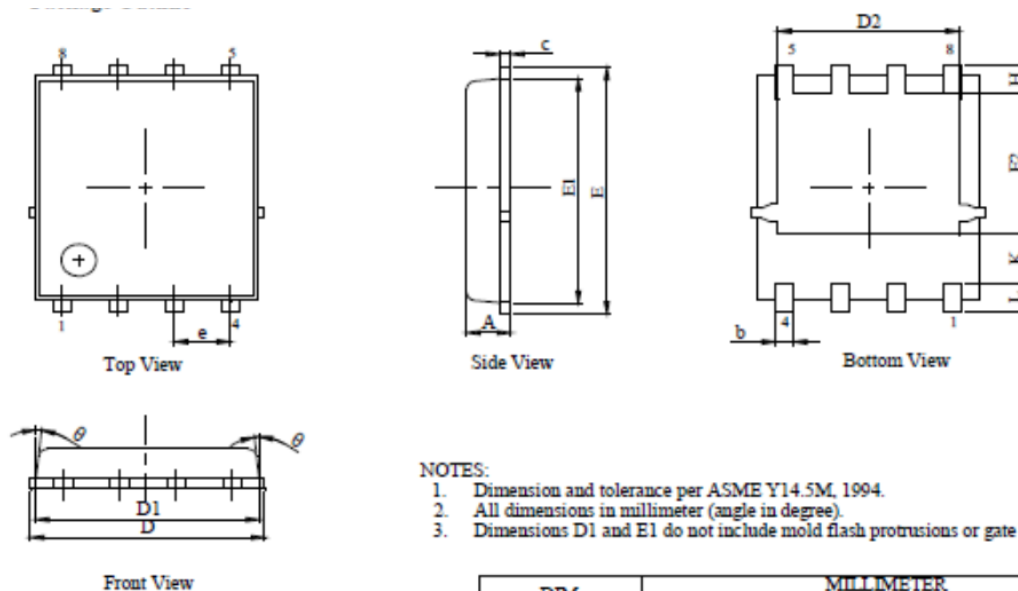


Figure 15. Normalized Maximum Transient Thermal Impedance

• Circuit diagram



• Package outlines :



- NOTES:
1. Dimension and tolerance per ASME Y14.5M, 1994.
 2. All dimensions in millimeter (angle in degree).
 3. Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

DIM	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.31	0.41	0.51
c	0.20	0.25	0.30
D	5.00	5.20	5.40
D1	4.95	5.05	5.15
D2	4.00	4.10	4.20
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.42	3.53	3.63
e	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
θ	-	-	10°

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