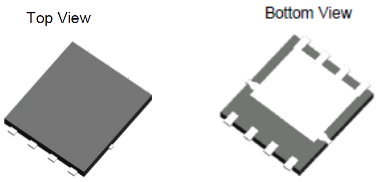
60V N-Channel Power MOSFET

DESCRIPTION：

- Ultra-low ON-resistance, $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% Rg Tested
- Halogen-free and RoHS compliant
- Pb-Free Lead Plating
- AEC-Q101 Qualified

V_{DSS}	60V
I_D @V_{GS}=10V	103A
$R_{DS(ON)\_Typ.}$ @V_{GS}=10V	4.0mΩ



PDFN5×6-8L

MAXIMUM RATINGS (at T_A = 25 °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	Tc=25℃ Tc=100℃	I_D	103 73	A
Pulsed Drain Current (1)		I_{DM}	412	A
Avalanche Current (2)		I_{AS}	25	A
Avalanche Energy (2)		E_{AS}	94	mJ
Power dissipation	Tc=25℃ Tc=100℃	P_D	94 47	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. This single-pulse measurement was taken under T_J_Max = 175°C..
2. This single-pulse measurement was taken under the following condition [L = 300μH, VGS = 10V, VDD = 30V] while its value is limited by T_J Max = 175°C.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	52 1.6	℃/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	$V_{(BR)DSS}$	60			V
Zero Gate Voltage Drain Current VDS = 48 V, VGS = 0 V (T_J = 25 °C/ T_J = 55 °C)	I_{DSS}			1.0/5.0	uA
Gate-Source Leakage Current VGS = ±20V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	1.2	1.6	2.5	V
Drain-Source On-State Resistance VGS = 10V, ID = 20A VGS = 4.5V, ID = 15A	$R_{DS(on)}$		4.0 5.2	5.0 6.5	mΩ
Forward Transconductance VDS = 5V, ID = 20A	G_{FS}		95		S
Input capacitance f=1MHz, VDS=30 V, VGS=0 V	C_{iss}		2030		pF
Output capacitance f=1MHz, VDS=30 V, VGS=0 V	C_{oss}		445		pF
Reverse transfer capacitance f=1MHz, VDS=30 V, VGS=0 V	C_{rss}		4.4		pF
Gate Resistance VDS=0 V, VGS= 0V, f=1MHz	R_g		1.8		Ω
Total Gate Charge VDS= 30V, ID= 20A, VGS= 10V VDS= 30V, ID= 20A, VGS= 4.5V	Q_G		32 14.9		nC
Gate to Source Charge VDS= 30V, ID= 20A, VGS=0 to 10V	Q_{GS}		4.4		nC
Gate to Drain Charge VDS= 30V, ID= 20A, VGS=0 to 10V	Q_{GD}		4.9		nC
Turn-on delay time VDS=30 V, VGS= 10V, R_L=1.5Ω, R_{GEN}=6Ω	td $_{(ON)}$		6.3		ns
Rise time VDS=30 V, VGS= 10V, R_L=1.5Ω, R_{GEN}=6Ω	tr		7.8		ns
Turn-off delay time VDS=30 V, VGS= 10V, R_L=1.5Ω, R_{GEN}=6Ω	td $_{(OFF)}$		39		ns
Fall time VDS=30 V, VGS= 10V, R_L=1.5Ω, R_{GEN}=6Ω	tf		15.5		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			103	A
Revers Recovery Time IF=20A, dI_F/dt = 100A/us	Trr		39		ns
Revers Recovery Charge IF=20A, dI_F/dt = 100A/us	Qrr		45		nC

Typical Performance Characteristics

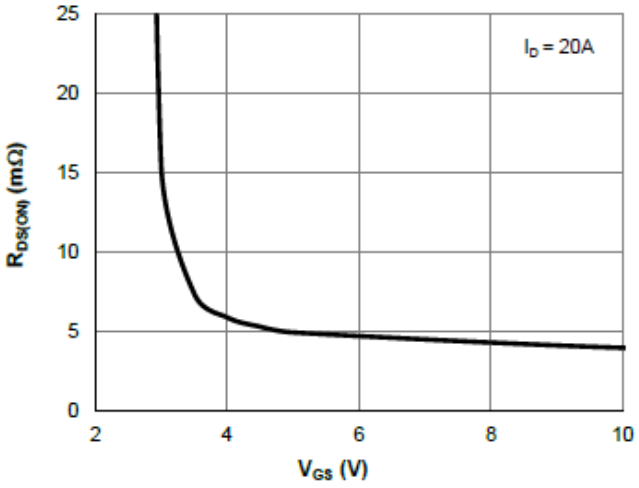


Figure 1. $R_{DS(ON)}$ vs. VGS

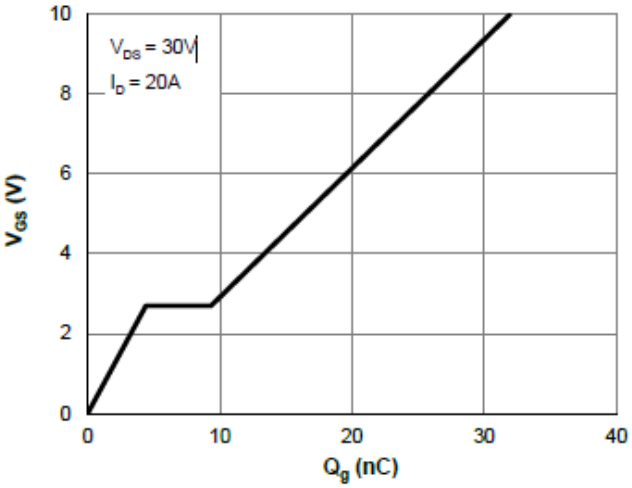


Figure 2. Gate Charge Characteristics

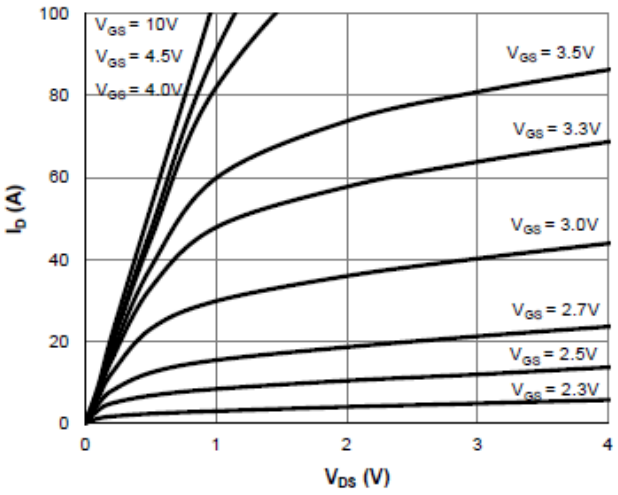


Figure 3. Saturation Characteristics

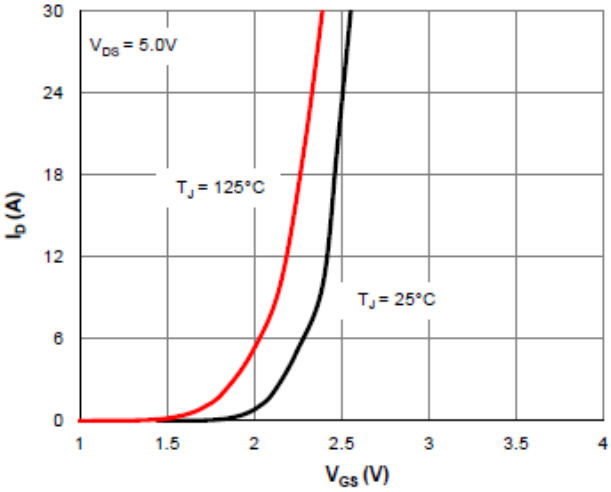


Figure 4. Transfer Characteristics

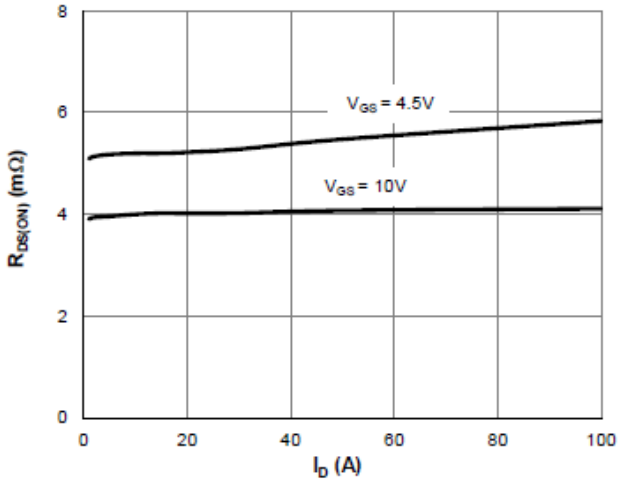


Figure 5. $R_{DS(ON)}$ vs. Drain Current

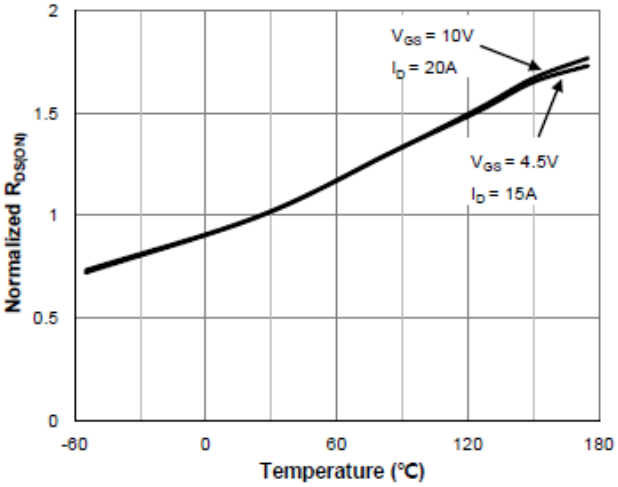


Figure 6. $R_{DS(ON)}$ vs. Junction Temperature

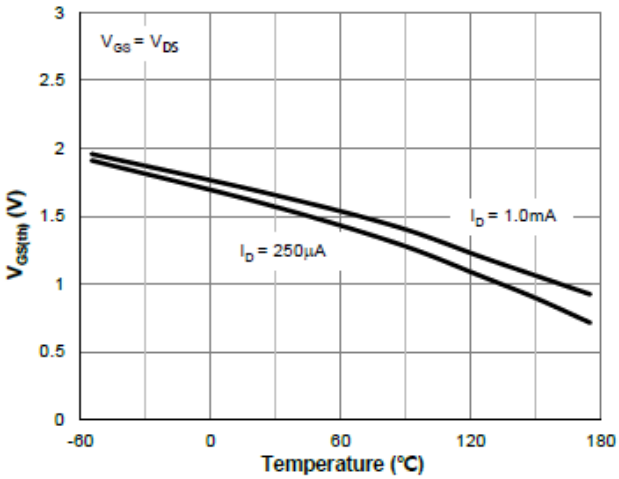


Figure 7. $V_{GS(th)}$ vs. Junction Temperature

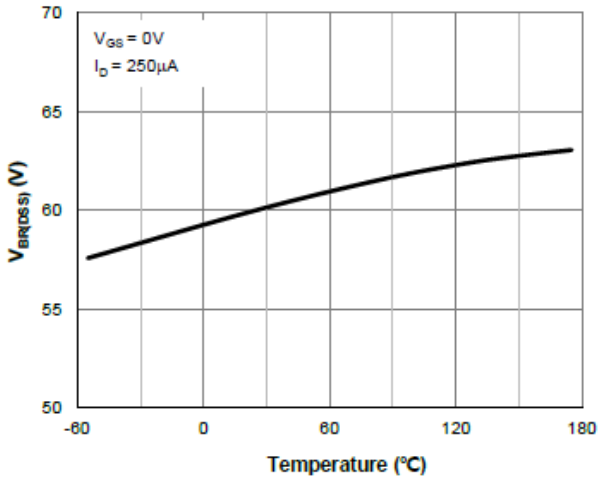


Figure 8. $V_{BR(DSS)}$ vs. Junction Temperature

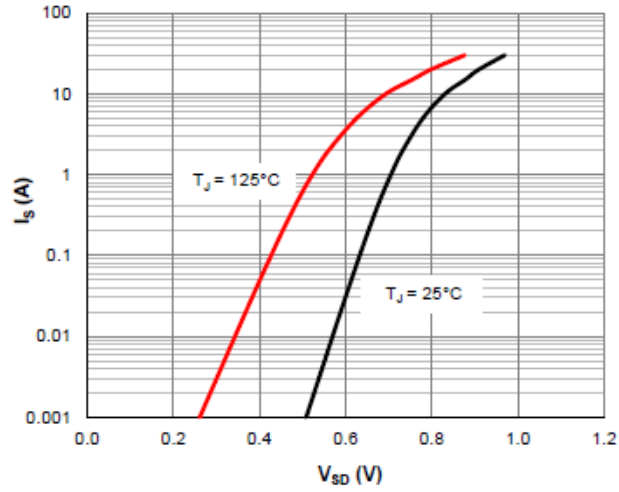


Figure 9. Body-Diode Characteristics

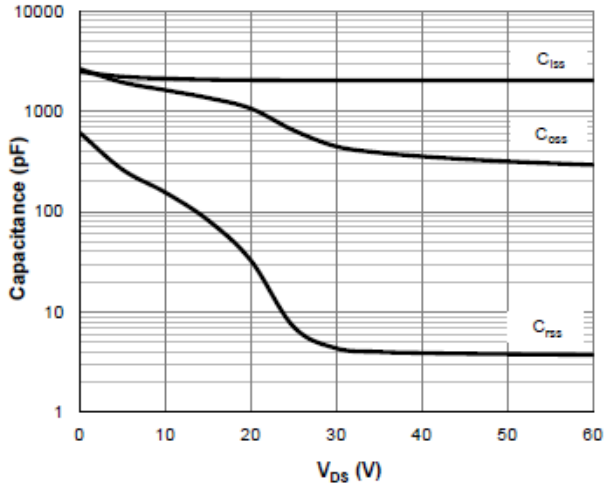


Figure 10. Capacitance Characteristics

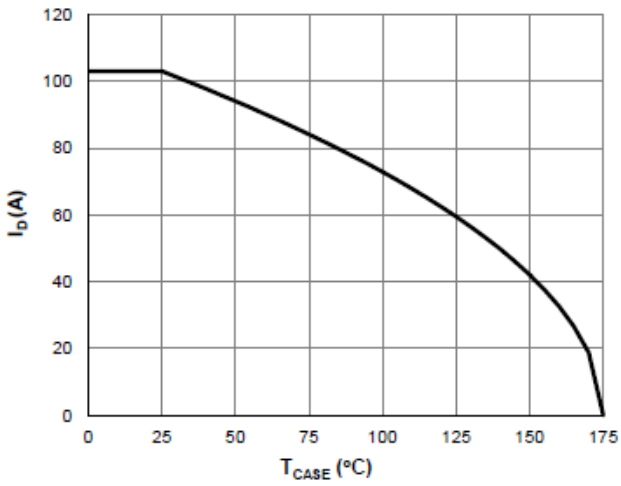


Figure 11. Current De-rating

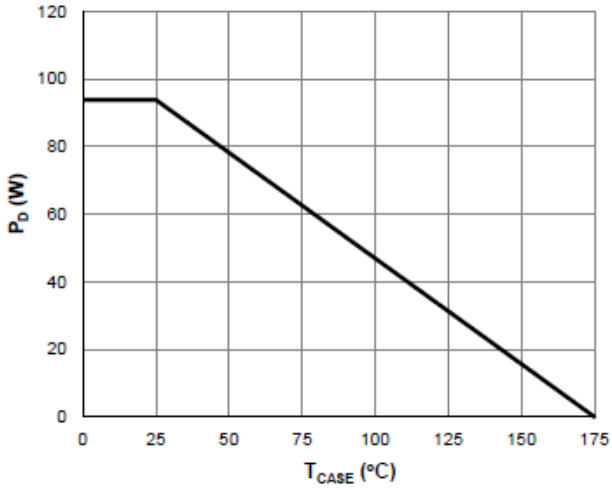


Figure 12. Power De-rating

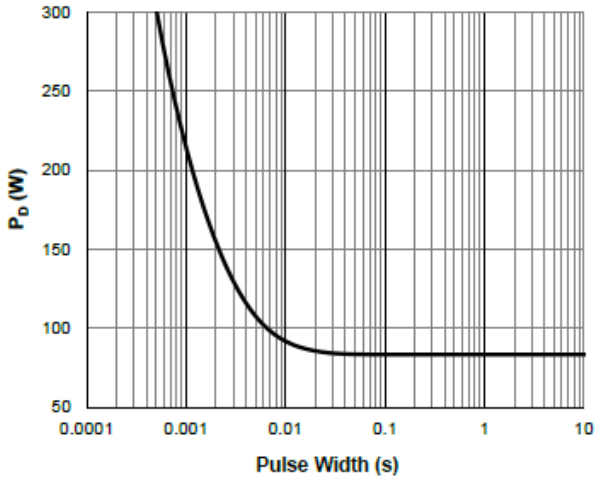


Figure 13. Single Pulse Power Rating, Junction-to-Case

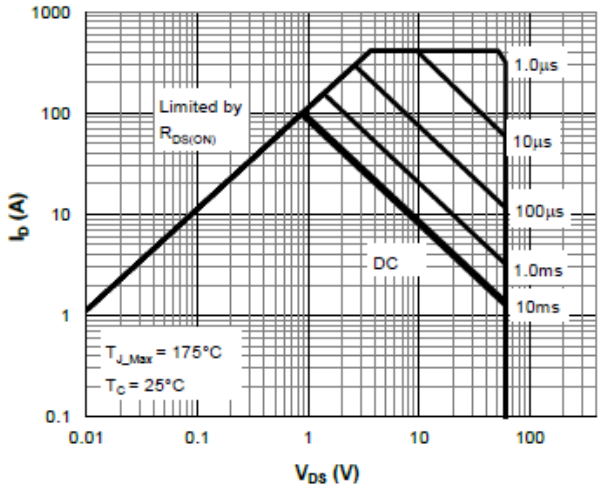


Figure 14. Maximum Safe Operating Area

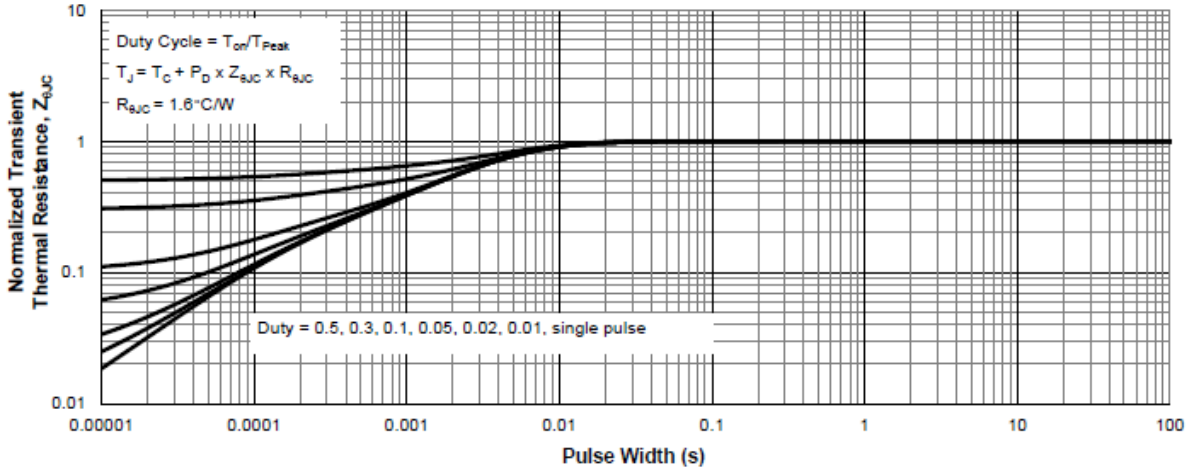
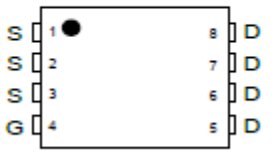


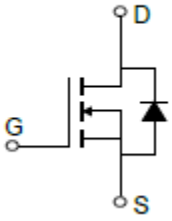
Figure 15. Normalized Maximum Transient Thermal Impedance

- Circuit diagram

Pin Configuration

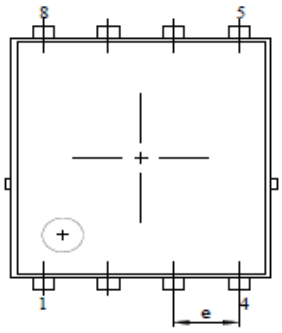
Top View



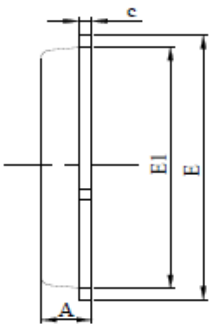


- Package outlines : Dimensions in (mm)

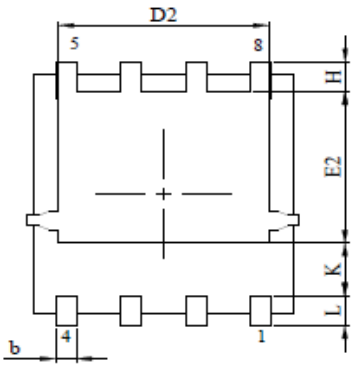
Package Outline



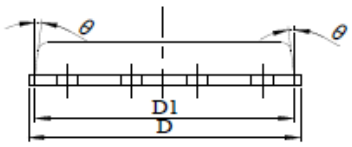
Top View



Side View



Bottom View



Front View

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
K		1.23 REF	
θ	-	-	10°

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