40V Dual N-Channel Power MOSFET

DESCRIPTION：

·Ultra-Low $R_{DS(ON)}$

·Low Gate Charge

·100% UIS Tested, 100% Rg Tested

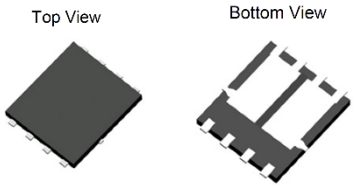
·Pb-Free Lead Plating

·RoHS compliant

·Halogen-free

·AEC-Q101 Qualified for Automotive Applications

V_{DSS}	40V
I_D @V_{GS}=10V	49A
$R_{DS(ON)_Typ.}$ @V_{GS}=10V	5.5mΩ



PDFN5x6-8L-D

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current(1)	Tc=25℃ Tc=100℃	I_D	49 35	A
Pulsed Drain Current (2)		I_{DM}	166	A
Avalanche Current (3)		I_{AS}	27	A
Avalanche Energy (3)		E_{AS}	36	mJ
Power dissipation	Tc=25℃ Tc=100℃	P_D	29 14.7	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+175	℃

Notes：1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 175°C.
3. This single-pulse measurement was taken under the following condition [L = 100uH, VGS=10V, VGS=20V] while its value is limited by T_{J_Max} = 175°C

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	40			V
Zero Gate Voltage Drain Current VDS = 32 V, VGS = 0 V, T_J = 25 °C VDS = 32 V, VGS = 0 V, T_J = 55 °C	I_{DSS}			1 5	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	$R_{DS(on)}$		5.5 7.0	6.9 9.5	mΩ
Forward Transconductance VDS = 5V, ID = 20A	G_{FS}		95		S
Input capacitance f=1MHz, VDS=20 V, VGS=0 V	C_{iss}		1227		pF
Output capacitance f=1MHz, VDS=20 V, VGS=0 V	C_{oss}		526		pF
Reverse transfer capacitance f=1MHz, VDS=20 V, VGS=0 V	C_{rss}		55		pF
Gate Resistance VDS=0 V, VGS= 0V, f=1MHz	R_g		2.7		Ω
Total Gate Charge VDS= 20V, ID= 20A, VGS= 10V VDS= 20V, ID= 20A, VGS= 4.5V	Q_G		17.9 9.7		nC
Gate to Source Charge VDS= 20V, ID= 20A, VGS= 0 to 10V	Q_{GS}		3.2		nC
Gate to Drain Charge VDS= 20V, ID= 20A,VGS= 0 to 10V	Q_{GD}		4.0		nC
Turn-on delay time VDS=20 V, VGS= 10V, R_L=1.0Ω, R_{GEN}=6Ω	td (ON)		5.0		ns
Rise time VDS=20 V, VGS= 10V, R_L=1.0Ω, R_{GEN}=6Ω	tr		7.0		ns
Turn-off delay time VDS=20 V, VGS= 10V, R_L=1.0Ω, R_{GEN}=6Ω	td (OFF)		23		ns
Fall time VDS=20 V, VGS= 10V, R_L=1.0Ω, R_{GEN}=6Ω	tf		14.8		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}		0.71	1.0	V
Diode Continuous Current, Tc=25℃	I_S			49	A
Revers Recovery Time IF=20A, dI_F/dt = 100A/us	Trr		26		ns
Revers Recovery Charge IF=20A, dI_F/dt = 100A/us	Qrr		14.0		nC

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	78 6.2	℃/W

Typical Performance Characteristics

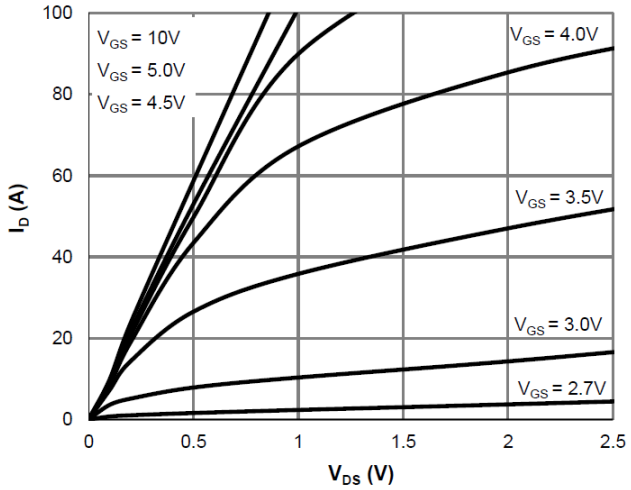


Figure 1. Saturation Characteristics

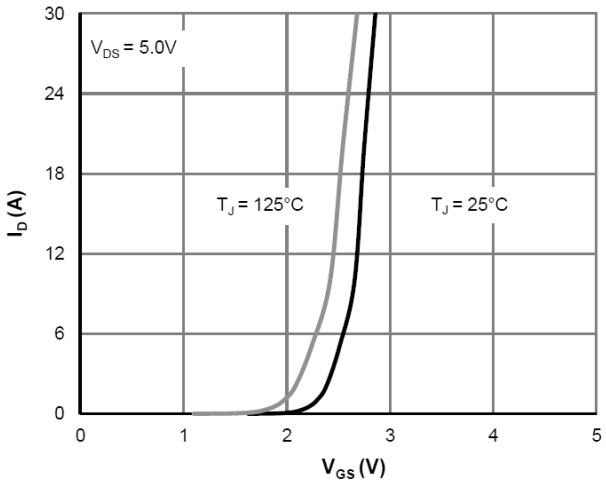


Figure 2. Transfer Characteristics

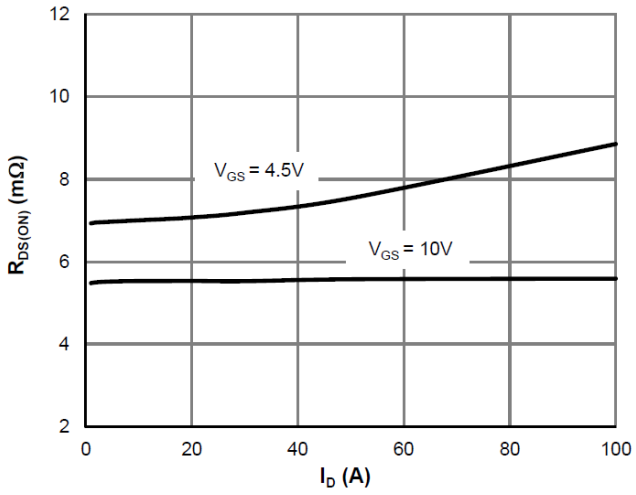


Figure 3. $R_{DS(ON)}$ vs. Drain Current

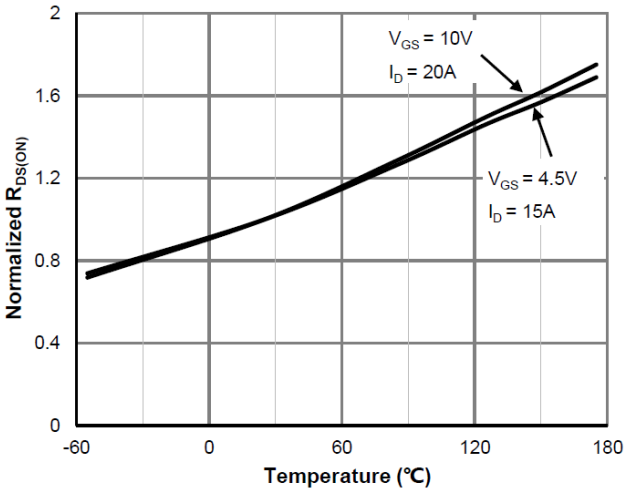


Figure 4. $R_{DS(ON)}$ vs. Junction Temperature

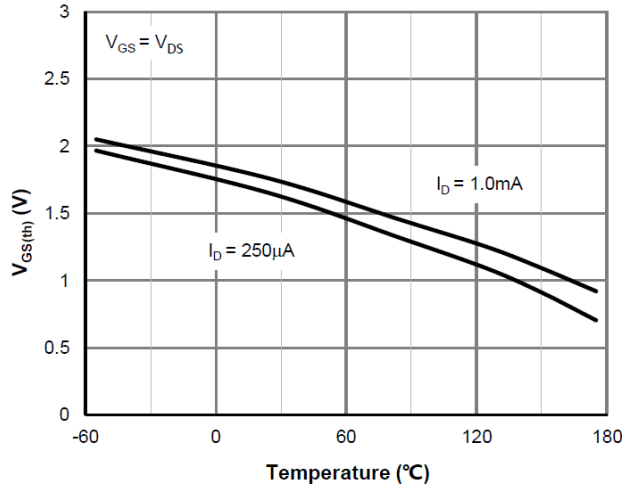


Figure 5. $V_{GS(th)}$ vs. Junction Temperature

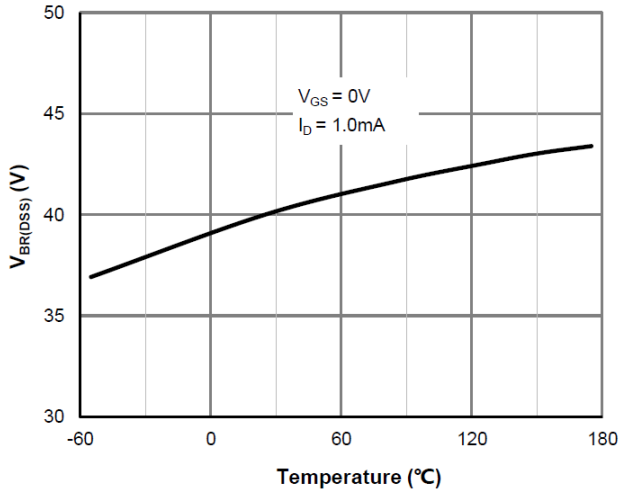


Figure 6. $V_{BR(DSS)}$ vs. Junction Temperature

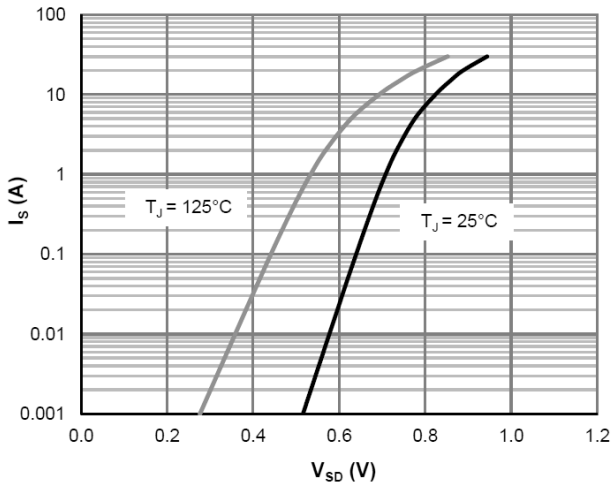


Figure 7. Body Diode Characteristics

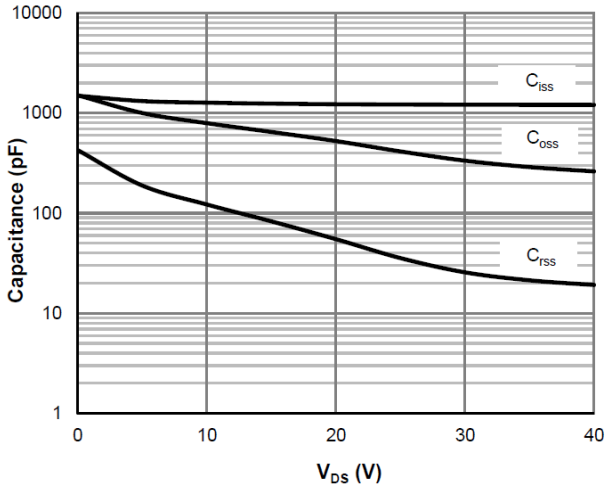


Figure 8 Capacitance Characteristics

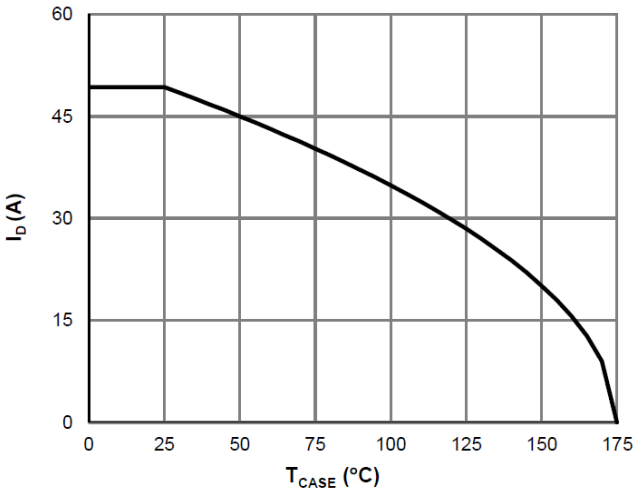


Figure 9. Current De-rating

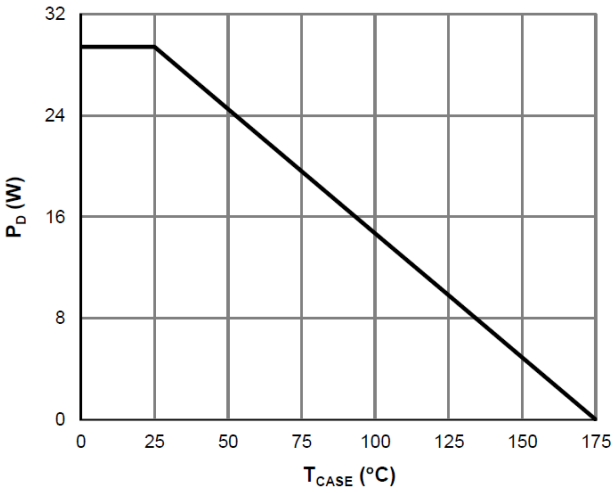


Figure 10. Power De-rating

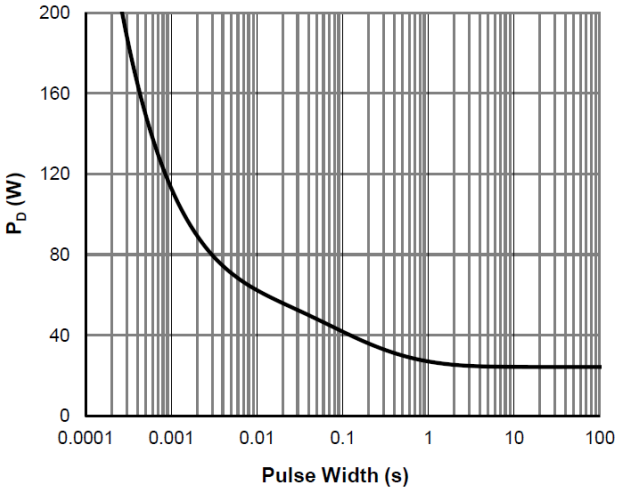


Figure 11. Single Pulse Power Rating, Junction-to-Case

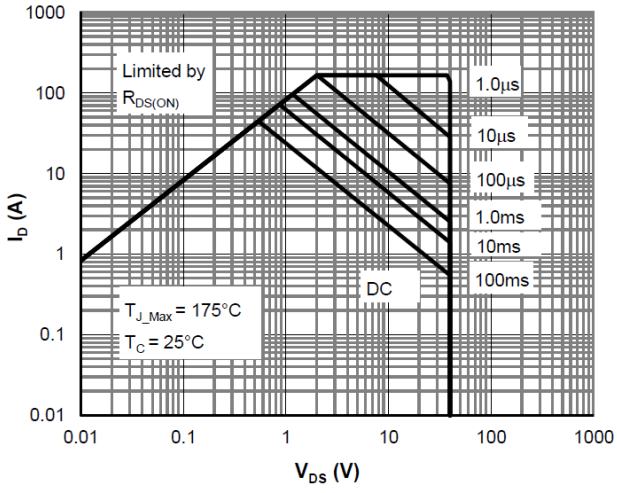


Figure 12. Maximum Safe Operating Area

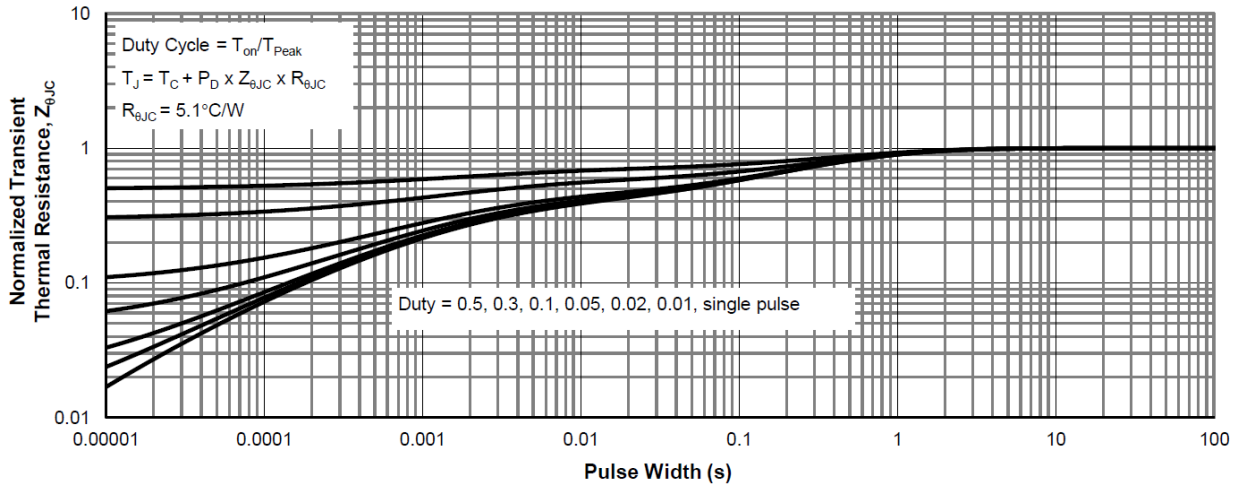
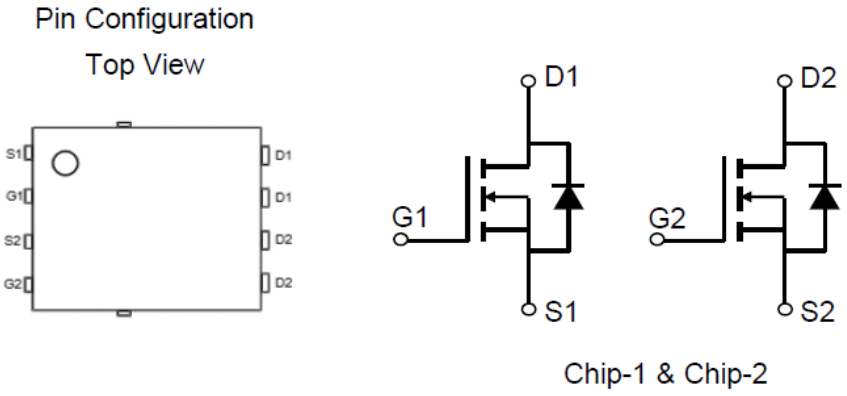
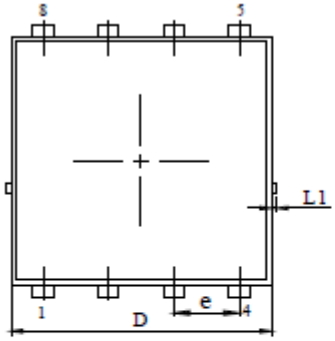


Figure 15. Normalized Maximum Transient Thermal Impedance

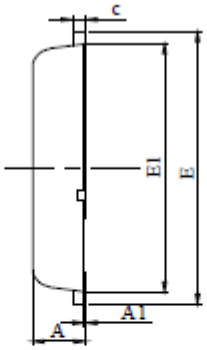
·Circuit diagram



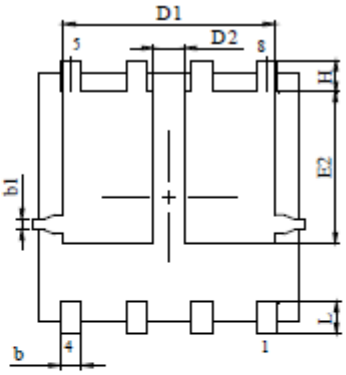
·Package outlines :



Top View



Side View



Bottom View



Front View

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE 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
A1	0.00	-	0.10
b	0.31	0.41	0.51
b1	0.15	0.25	0.35
c	0.23	-	0.33
D	4.95	5.05	5.15
D1	4.00	4.10	4.20
D2	0.50	0.60	0.70
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.31	3.41	3.51
e	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
L1	-	-	0.125
a	-	-	12°

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