-40V P-Channel Power MOSFET

DESCRIPTION：

V_{DS}	-40V
I_D	-81A
$R_{DS(ON)_Typ.}$@V_{GS}=-10V	7.0mΩ

P-Channel Enhancement Mode - Logic Level

·AEC-Q101 Qualified, PPAP Capable

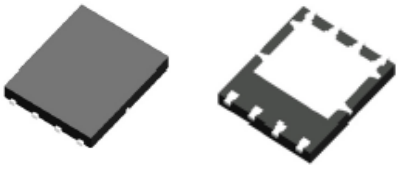
·175°C Operating Temperature

·100% ΔVDS & UIS & Rg Tested

·Green Molding Compound

·Moisture Sensitivity: Level 1 per J-STD-020

·UL Flammability Classification Rating 94V-0



PDFN5x6-8L

TYPICAL APPLICATIONS：

·General Automotive Applications

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-40	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (1)	T_C = 25℃ T_C = 100℃	I_D	-81 -57	A
Pulsed Drain Current, tp<10us(2)		I_{DM}	-324	A
Single Pulsed Avalanche Energy(3)		E_{AS}	212	mJ
Single Pulse Avalanche Current (L= 0.1mH)		I_{AS}	-35	A
Power dissipation	T_C = 25℃ T_C = 100℃	P_D	88 44	mW
Junction & Storage temperature Range		T_J, T_{STG}	-55~+175	℃

Notes： 1. This current is chip limited, which is calculated based on Rthjc.

2. This current is calculated on single pulse with 10μs Pulse.

3. Defined by design, not subject to production test, E_{AS} condition: T_J=25°C, V_{DD}= -20V, V_{GS}= -10V, L=1.0mH.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	46 1.7	℃/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	$V_{(BR)DSS}$	-40			V
Zero Gate Voltage Drain Current VDS = -40 V, VGS = 0 V, T_J = 25 °C VDS = -40 V, VGS = 0 V, T_J = 125 °C	I_{DSS}			-1 -100	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	-1.8	-2.5	V
Drain-Source On-State Resistance VGS = -10V, ID = -20A VGS = -4.5V, ID = -15A	$R_{DS(on)}$		7.0 10.3	8.3 13.4	mΩ
Forward Transconductance VDS = -5.0V, ID = -20A	g_{fs}		30		S
Diodes Forward Voltage IS = -2.0A, VGS = 0V	V_{SD}		-0.7	-1.2	V
Input capacitance f=1MHz, VDS=-20 V, VGS=0 V	C_{iss}		1511	1964	pF
Output capacitance f=1MHz, VDS=-20 V, VGS=0 V	C_{oss}		1077	1400	pF
Reverse transfer capacitance f=1MHz, VDS=-20 V, VGS=0 V	C_{rss}		70	140	pF
Gate Resistance VGS = 0V, VDS = 0V, f = 1MHz	Rg		12		Ω
Turn-on delay time VDD= -20V, VGS= -10V, ID=-20A, R_{GEN}=3.0Ω	$t_{d\,(ON)}$		5.6		ns
Rise time VDD= -20V, VGS= -10V, ID=-20A, R_{GEN}=3.0Ω	tr		13		ns
Turn-off delay time VDD= -20V, VGS= -10V, ID=-20A, R_{GEN}=3.0Ω	$t_{d\,(OFF)}$		47		ns
Fall time VDD= -20V, VGS= -10V, ID=-20A, R_{GEN}=3.0Ω	tf		26		ns
Total Gate Charge VDS =-20V, ID =-20A, VGS =-10V VDS =-20V, ID =-20A, VGS =-4.5V	Qg		24 11.8	31 15.3	nC
Gate-Source Charge VDS =-20V, ID =-20A, VGS =-10V	Q_{gS}		4.4	6.6	nC
Gate-Drain("Miller") Charge VDS =-20V, ID =-20A, VGS =-10V	Q_{gd}		3.8	5.7	nC
Gate Plateau Voltage VDS =-20V, ID =-20A, VGS =-10V	$V_{plateau}$		-3.1		V
Reverse Recovery Time I_S=-20A,di/dt=100A/μs, T_J=25℃	Trr		38		nS
Reverse Recovery Charge I_S=-20A,di/dt=100A/μs, T_J=25℃	Qrr		25		nC
Maximum Continuous Drain to Source Diode Forward Current	I_S			-81	A

Typical Performance Characteristics

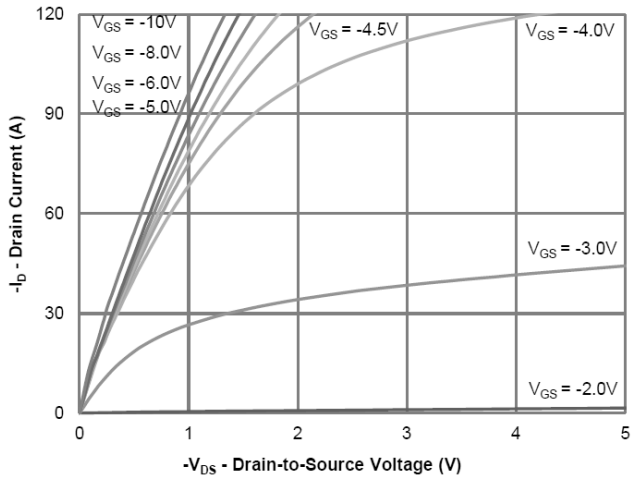


Figure 1. Output Characteristics

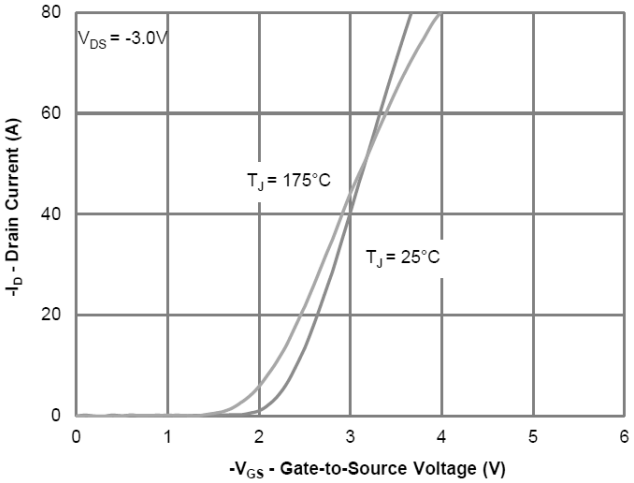


Figure 2. Transfer Characteristics

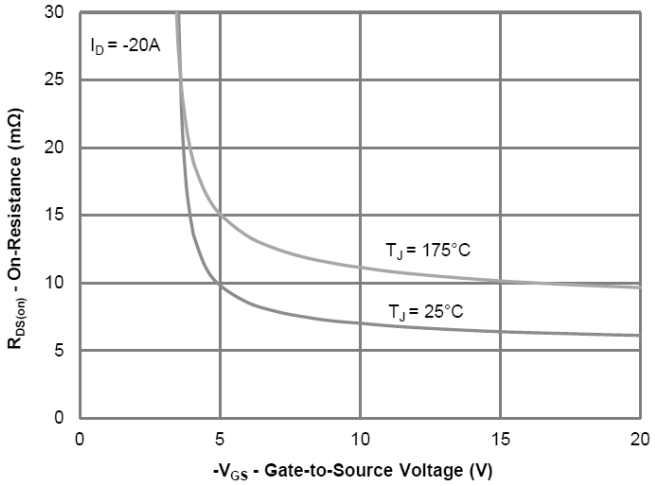


Figure 3. On-Resistance vs. Gate-Source Voltage

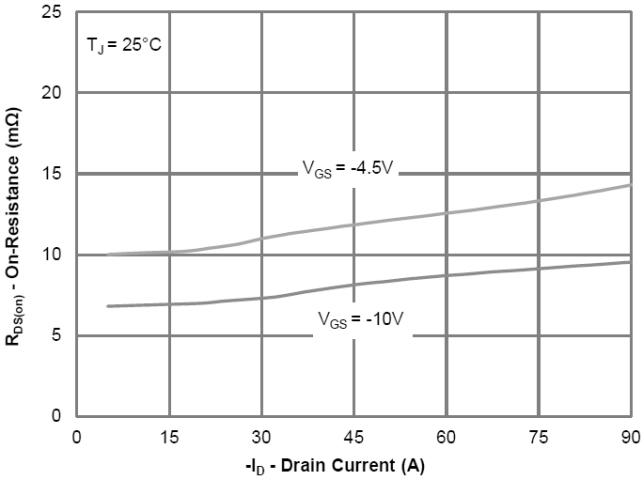


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

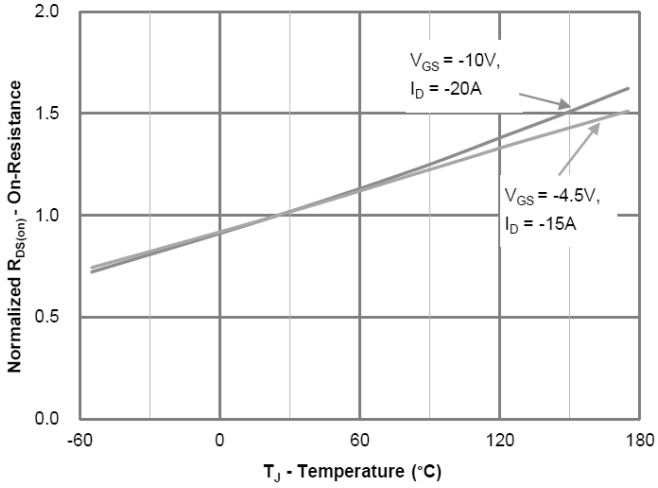


Figure 5. On-Resistance vs. Junction Temperature

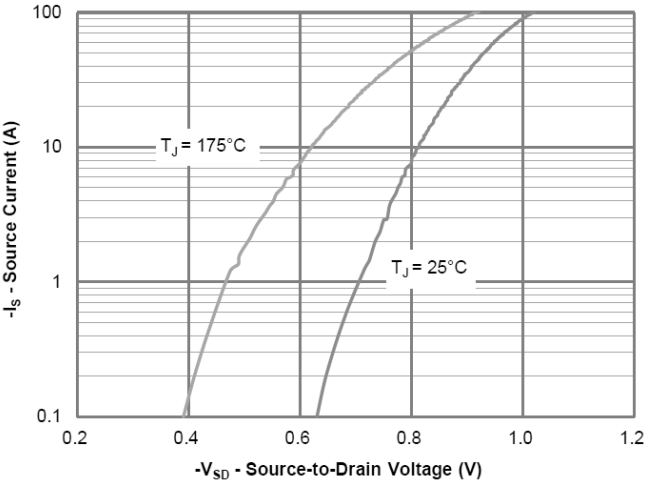


Figure 6. Source-Drain Diode Forward Voltage

Typical Performance Characteristics

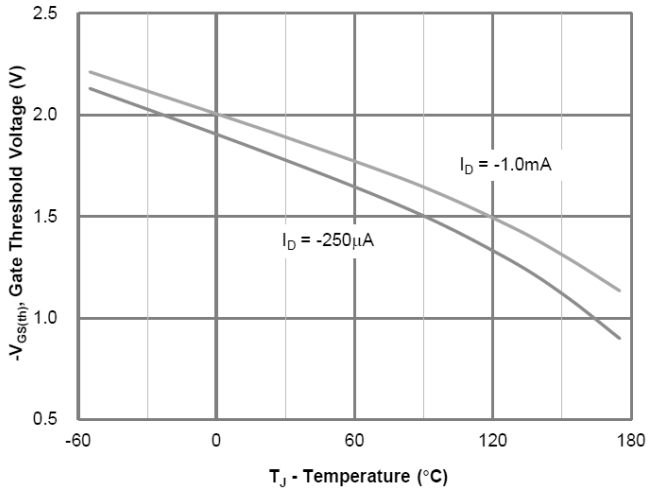


Figure 7. Gate Threshold Variation vs. Junction Temperature

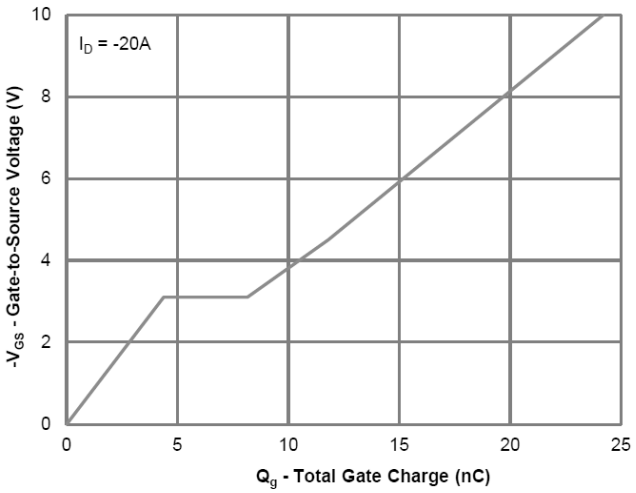


Figure 8. Gate Charge Characteristics

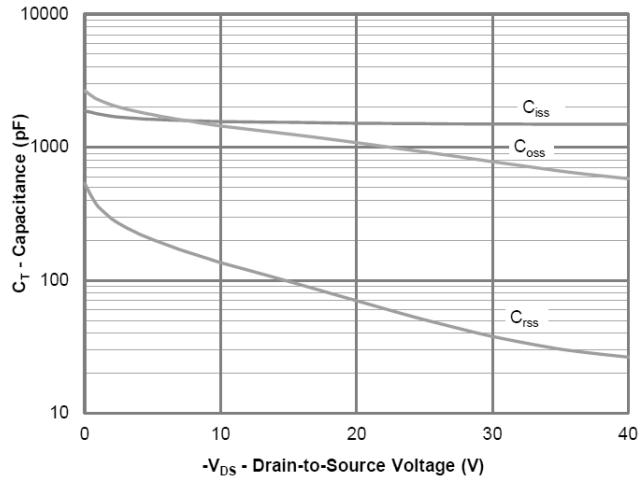


Figure 9. Capacitance Characteristics

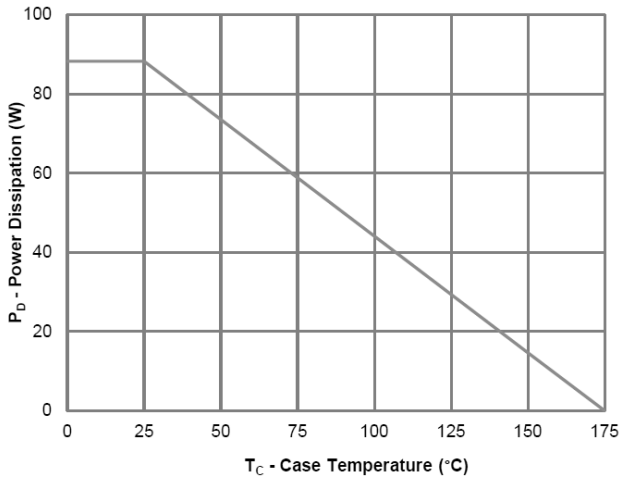


Figure 10. Power Derating

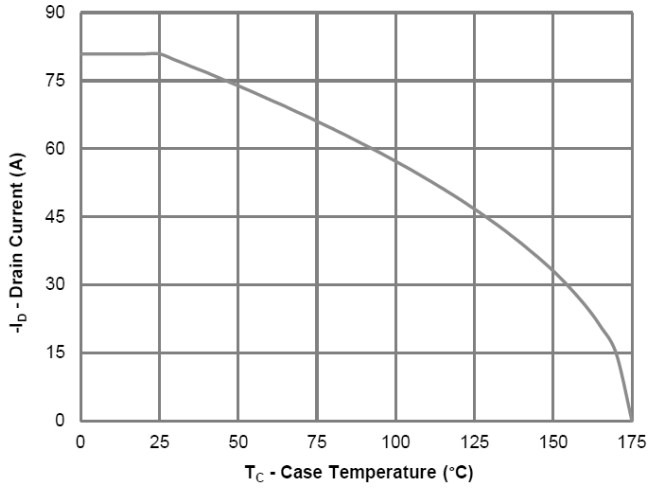


Figure 11. Current Derating

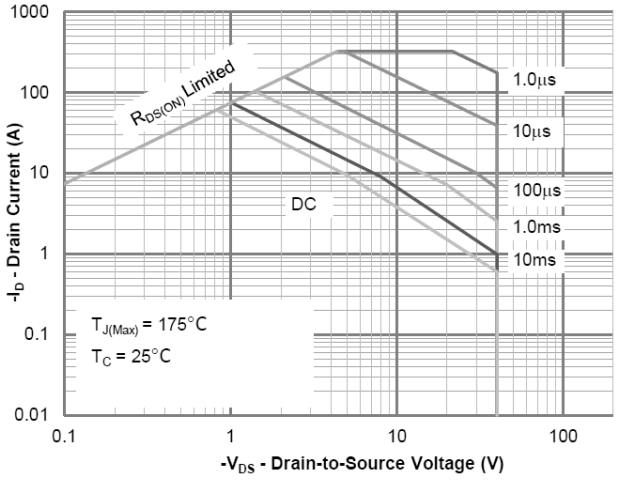


Figure 12: Safe Operating Area

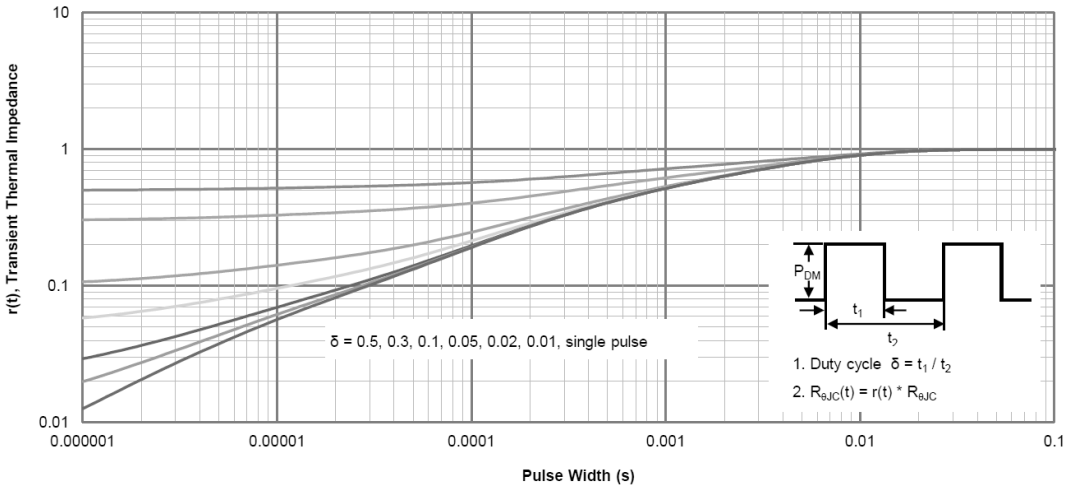
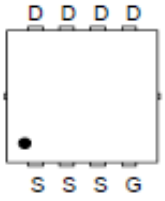
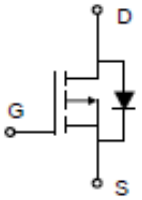


Figure 13: Normalized Maximum Transient Thermal Impedance

·Circuit diagram

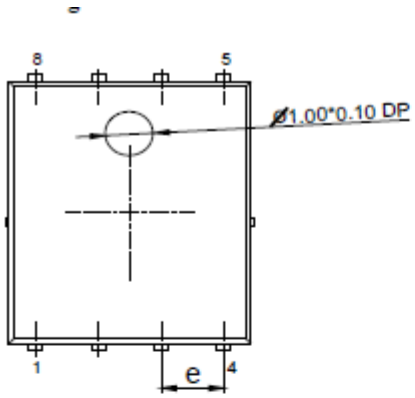


PIN Configuration
(Top View)

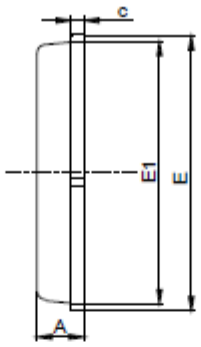


Schematic Diagram

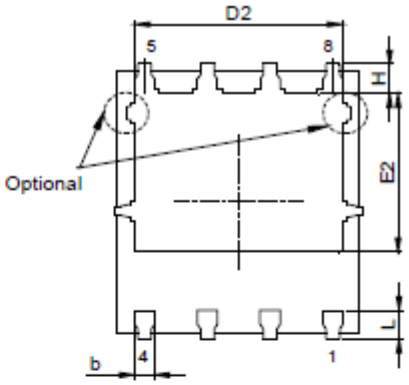
·Package outlines : Dimensions in (mm)



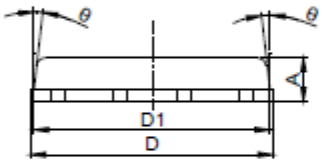
Top View



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	1.05	1.20
b	0.20	0.41	0.51
c	0.20	0.25	0.35
D	4.80	–	5.40
D1	4.65	–	5.30
D2	3.60	–	4.30
E	5.90	–	6.30
E1	5.60	–	6.00
E2	3.37	–	3.92
e	1.27BSC		
H	0.40	0.60	0.75
L	0.40	0.60	0.84
θ	0°	–	12°

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