

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-40V	30mΩ@-10V	-20A
	45mΩ@-4.5V	

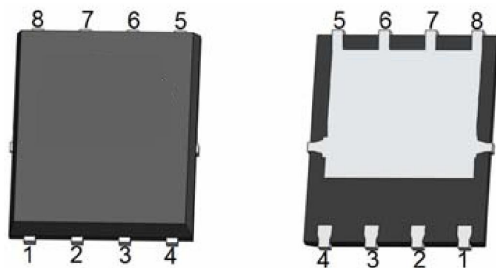
Feature

- Trench power LV MOSFET technology
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- High density cell design for low $R_{DS(ON)}$
- Suffix "-Q1" for AEC-Q101

Application

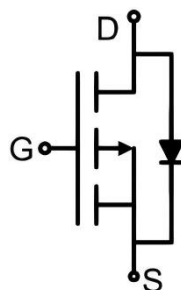
- Power management
- Portable equipment

Package

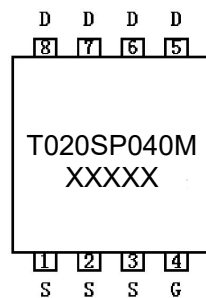


PDFN5*6-8L

diagram



Marking



Absolute maximum ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C=25^{\circ}\text{C}$)	I_D	-20	A
Continuous Drain Current ($T_C=100^{\circ}\text{C}$)	$I_D (100^{\circ}\text{C})$	-12	A
Pulsed Drain Current ¹⁾	I_{DM}	-70	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	50	mJ
Power Dissipation ³⁾ ($T_C=25^{\circ}\text{C}$)	P_D	31	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	4	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Electrical characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.1	-1.6	-2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$		23	30	m Ω
		$V_{GS}=-4.5V, I_D=-15A$		33	45	
Dynamic characteristics ⁴⁾						
Input Capacitance	C_{iss}	$V_{DS}=-20V, V_{GS}=0V, f=1MHz$		1080		pF
Output Capacitance	C_{oss}			120		
Reverse Transfer Capacitance	C_{rss}			110		
Total Gate Charge	Q_g	$V_{DS}=-20V, V_{GS}=-10V$ $I_D=-10A$		17		nC
Gate-Source Charge	Q_{gs}			4.5		
Gate-Drain Charge	Q_{gd}			4		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=-20V, V_{GS}=-10V$ $I_D=-10A, R_G=3\Omega$		7		nS
Turn-on rise time	t_r			24		
Turn-off delay time	$t_{d(off)}$			20		
Turn-off fall time	t_f			16		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				-20	A
Diode Forward voltage	V_{SD}	$V_{GS}=0V, I_S=-20A$			-1.2	V
Reverse recover time	T_{rr}	$I_F=-10A, di/dt=-100A/us$		19		nS
Reverse recovery charge	Q_{rr}			9		nC

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) $T_J=25^{\circ}\text{C}$, $V_{DD}=-35V$, $V_G=-10V$, $R_G=25\Omega$, $L=1\text{mH}$, $I_{AS}=-10A$.
- 3) P_D is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

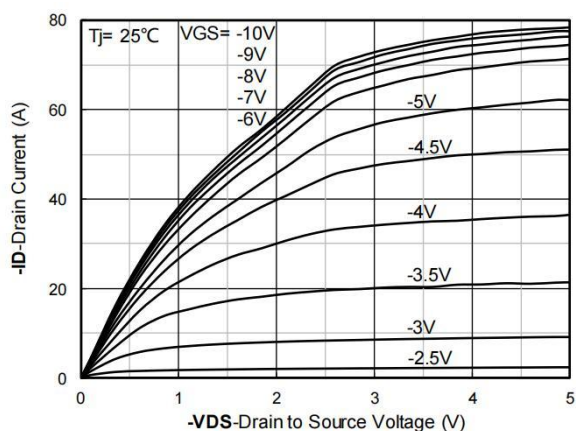


Figure 1. Output Characteristics

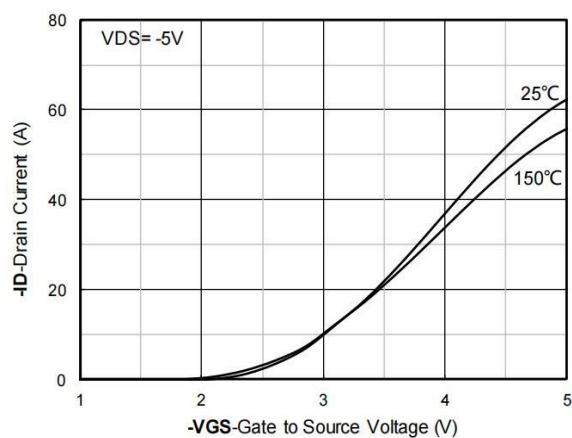


Figure 2. Transfer Characteristics

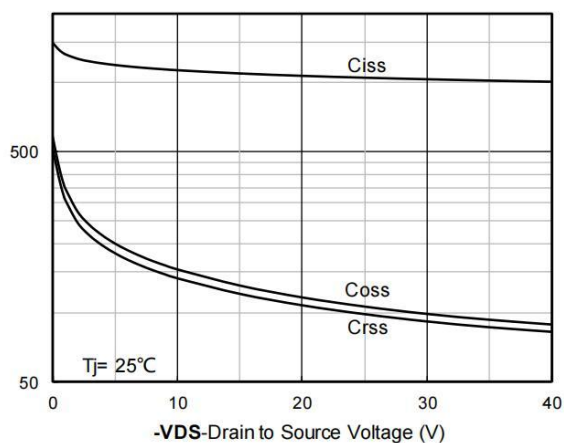


Figure 3. Capacitance Characteristics

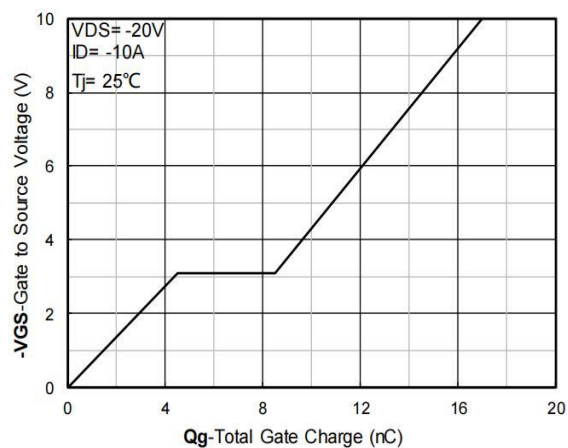


Figure 4. Gate Charge

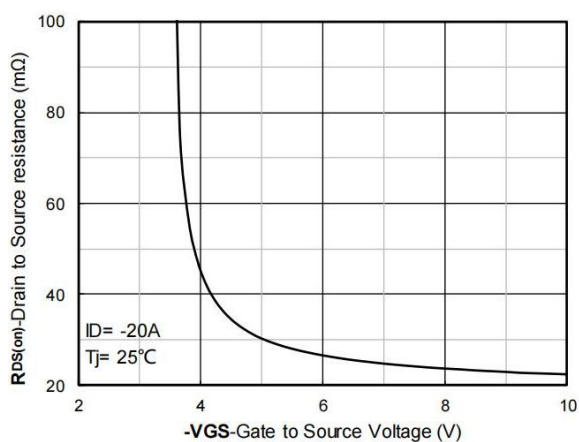


Figure 5. On-Resistance vs Gate to Source Voltage

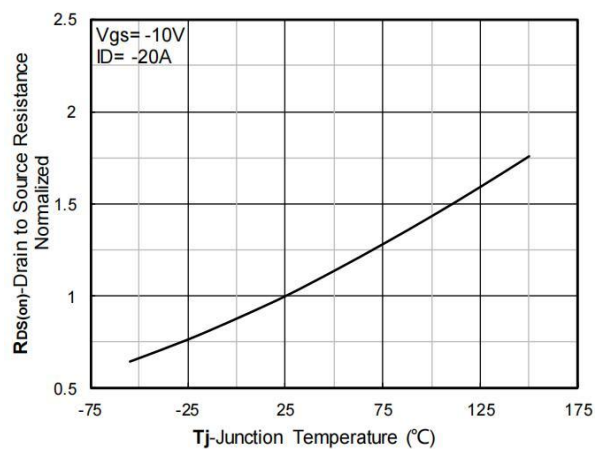


Figure 6. Normalized On-Resistance

Typical Characteristics

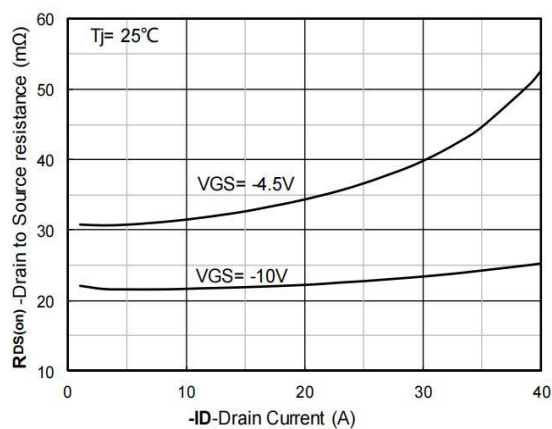


Figure 7. $R_{DS(on)}$ VS Drain Current

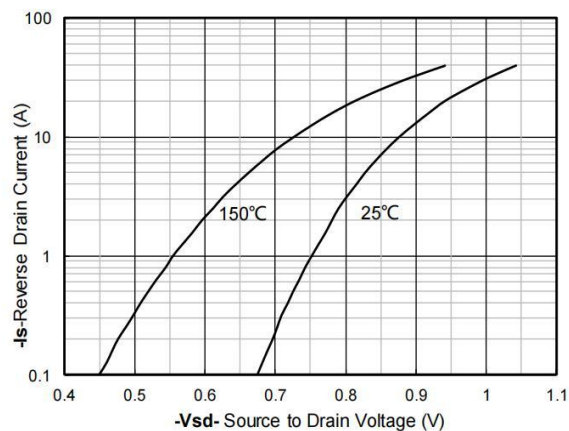


Figure 8. Forward characteristics of reverse diode

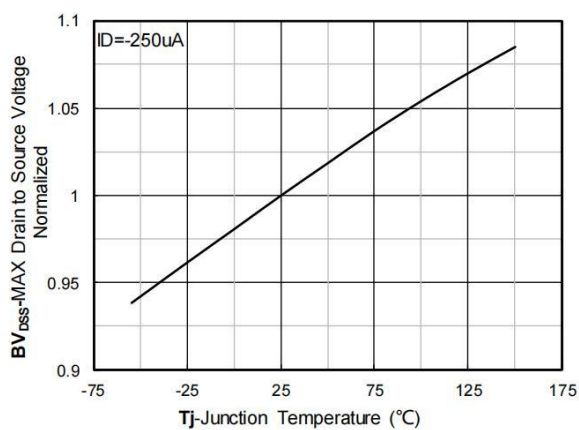


Figure 9. Normalized breakdown voltage

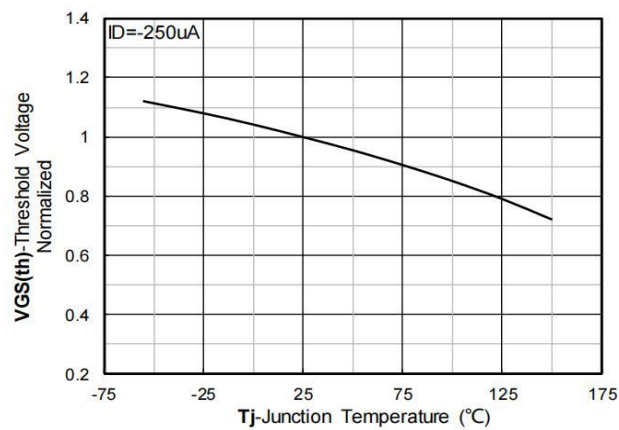


Figure 10. Normalized Threshold voltage

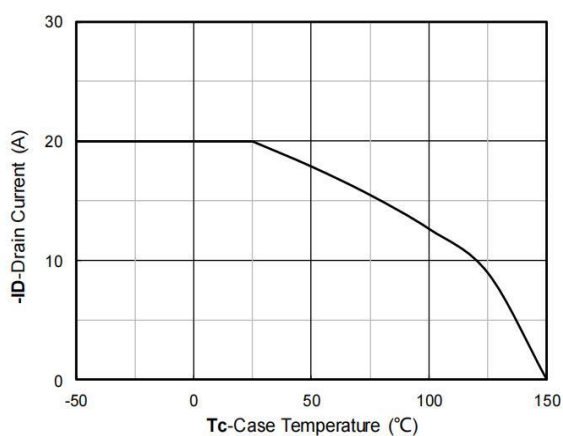


Figure 11. Current dissipation

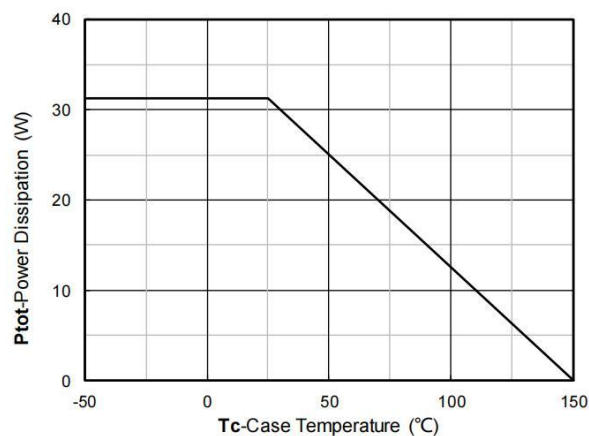


Figure 12. Power dissipation

Typical Characteristics

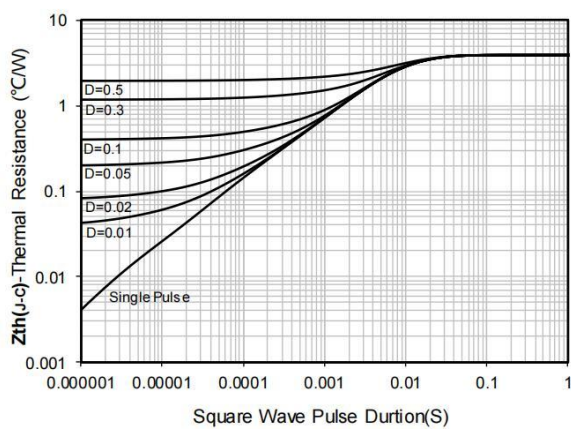


Figure 13. Maximum Transient Thermal Impedance

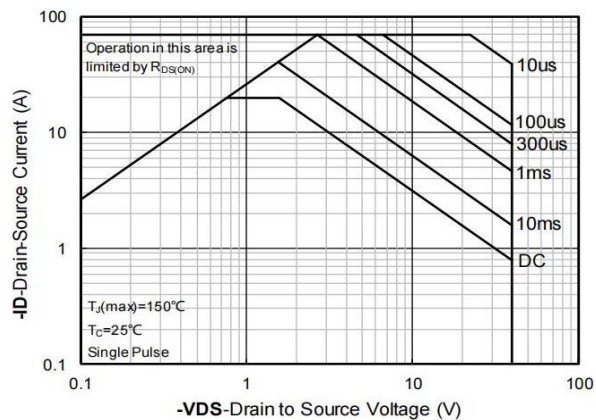
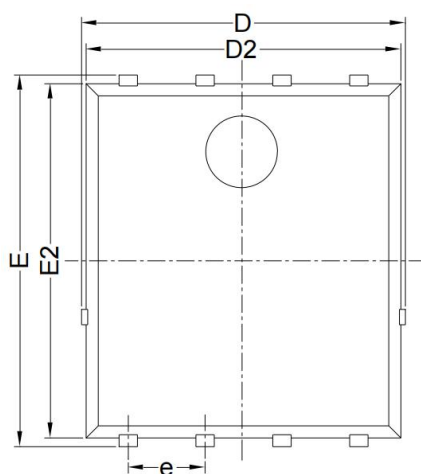
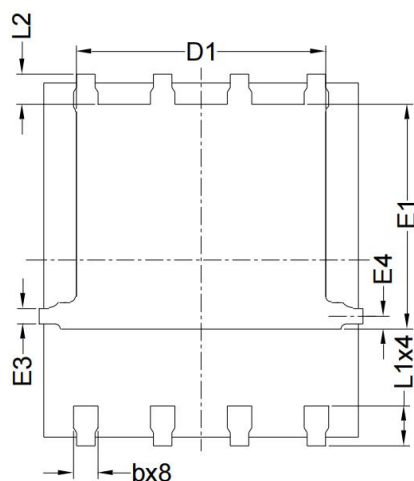


Figure 14. Safe Operation Area

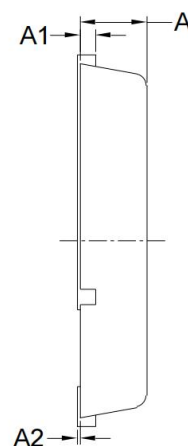
PDFN5*6-8L Package Information



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
D	5.150	5.550	0.203	0.219
E	5.950	6.350	0.234	0.250
A	1.000	1.200	0.039	0.047
A1	0.254 BSC.		0.010 BSC.	
A2	0.000	0.100	0.000	0.004
D1	3.920	4.320	0.154	0.170
E1	3.520	3.920	0.139	0.154
D2	5.000	5.400	0.197	0.213
E2	5.660	6.060	0.223	0.239
E3	0.254 REF.		0.010 REF.	
E4	0.210 REF.		0.008 REF.	
L1	0.560	0.760	0.022	0.030
L2	0.500 BSC.		0.020 BSC.	
b	0.310	0.510	0.012	0.020
e	1.270 BSC.		0.050 BSC.	