

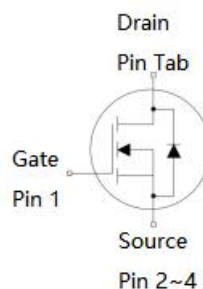
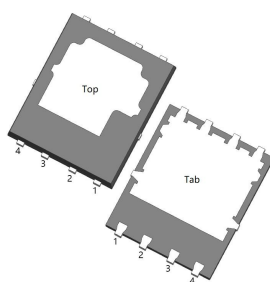
FEATURES

- Low gate charge
- Low Ciss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS 2.0 Compliant Qualified
- according to AEC Q101

100% DVDS Tested
100% Avalanche Tested


Product Summary

V_{DS}	40	V
$R_{DS(on), Typ @ V_{GS}=10V}$	0.61	mΩ
I_D	320	A


PDFN5*6-8 Double Cooling

Absolute Maximum Ratings($T_C=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Voltage	V_{DS}	-	-	40	V	-
Gate-Source Voltage	V_{GS}	-20	-	20	V	-
Continuous Drain Current(Package Limited)	I_D	-	-	320	A	$T_C=25^{\circ}\text{C}$
		-	-	150	A	$T_C=25^{\circ}\text{C}$ package limit
		-	-	130	A	$T_C=100^{\circ}\text{C}$
Pulsed Drain Current(Note1)	I_{DM}	-	-	450	A	-
Single Pulse Avalanche Energy	E_{AS}	-	-	287	mJ	$L=9.8\mu\text{H}, V_D=32\text{V}, T_C=25^{\circ}\text{C}, I_{AS}=150\text{A}, R_g=25\Omega$
Maximum Power Dissipation	P_D	-	-	166	W	$T_C=25^{\circ}\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55	-	175	$^{\circ}\text{C}$	-
Maximum lead temperature for soldering purposes, 1/8"from case for 5 seconds	T_L	-	-	260	$^{\circ}\text{C}$	-

Thermal Characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Thermal resistance , Channel to Case	$R_{th(ch-c)}$	-	-	0.9	$^{\circ}\text{C}/\text{W}$	-
Thermal resistance , Channel to Top Plate	$R_{th(ch-tp)}$	-	-	0.95		(Note3)

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

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Breakdown Voltage	BV_{DSS}	40	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=40V, V_{GS}=0V$
Gate-Body Leakage Current, Forward	I_{GSSF}	-	-	100	nA	$V_{GS}=20V, V_{DS}=0V$
Gate-Body Leakage Current, Reverse	I_{GSSR}	-	-	-100	nA	$V_{GS}=-20V, V_{DS}=0V$
Gate-Source Threshold Voltage	$V_{GS(th)}$	2.0	2.8	3.5	V	$V_{DS}=V_{GS}, I_D=1mA$
Drain-Source On-State Resistance	$R_{DS(on)}$	-	0.61	0.9	$m\Omega$	$V_{GS}=10V, I_D=75A$
Drain-Source On-State Resistance	$R_{DS(on)}$	-	0.85	1.30	$m\Omega$	$V_{GS}=6V, I_D=75A$
Gate Resistance	R_g	-	2.5	-	Ω	$V_{GS}=0V, V_{DS}$ Open, $f=1MHz$

Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	C_{iss}	-	6500	-	pF	$V_{DS}=25V, V_{GS}=0V, f=300kHz$
Output Capacitance	C_{oss}	-	1950	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	98	-	pF	
Turn-On Delay Time	$t_{d(on)}$	-	19	-	ns	$V_{DD}=17.5V, R_G=5\Omega, V_{GS}=10V, R_L=0.235\Omega$
Turn-On Rise Time	t_r	-	26	-	ns	
Turn-Off Delay Time	$t_{d(off)}$	-	85	-	ns	
Turn-Off Fall Time	t_f	-	45	-	ns	

Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	Q_g	-	120	-	nC	$V_{DS}=32V, I_D=150A, V_{GS}=10V$
Gate-Source Charge	Q_{gs}	-	39	-	nC	
Gate-Drain Charge	Q_{gd}	-	26	-	nC	
Gate plateau voltage	$V_{plateau}$	-	4.9	-	V	

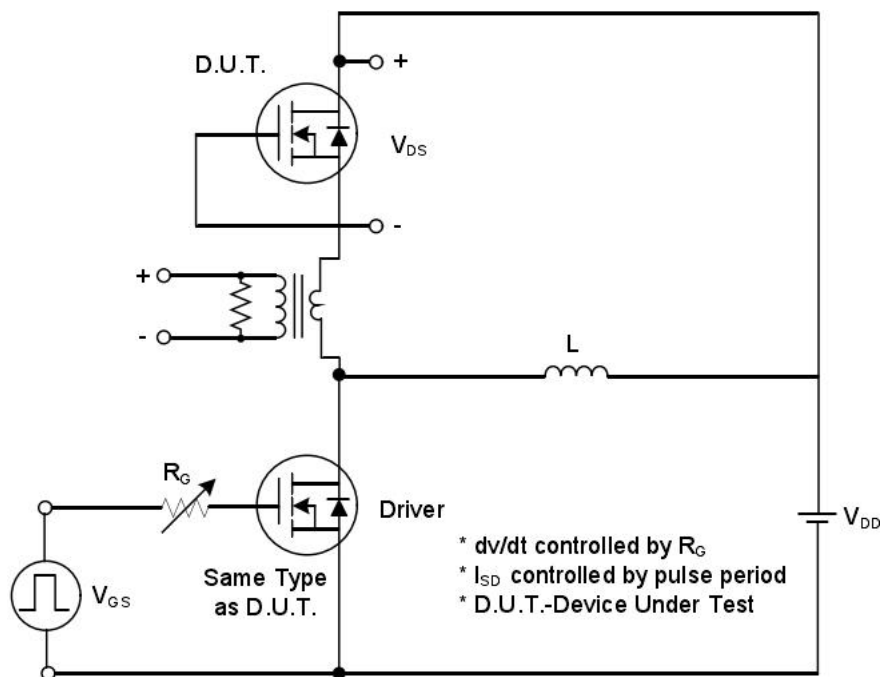
Reverse diode

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	I_S	-	-	150	A	-
Pulsed Diode Forward Current	I_{SM}	-	-	450	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$I_S=20A, V_{GS}=0V$
Reverse Recovery Time	t_{rr}	-	141	-	ns	$V_D=35V, I_F=10A$
Reverse Recovery Charge	Q_{rr}	-	333	-	nC	$di/dt=100A/\mu s, (Note2)$

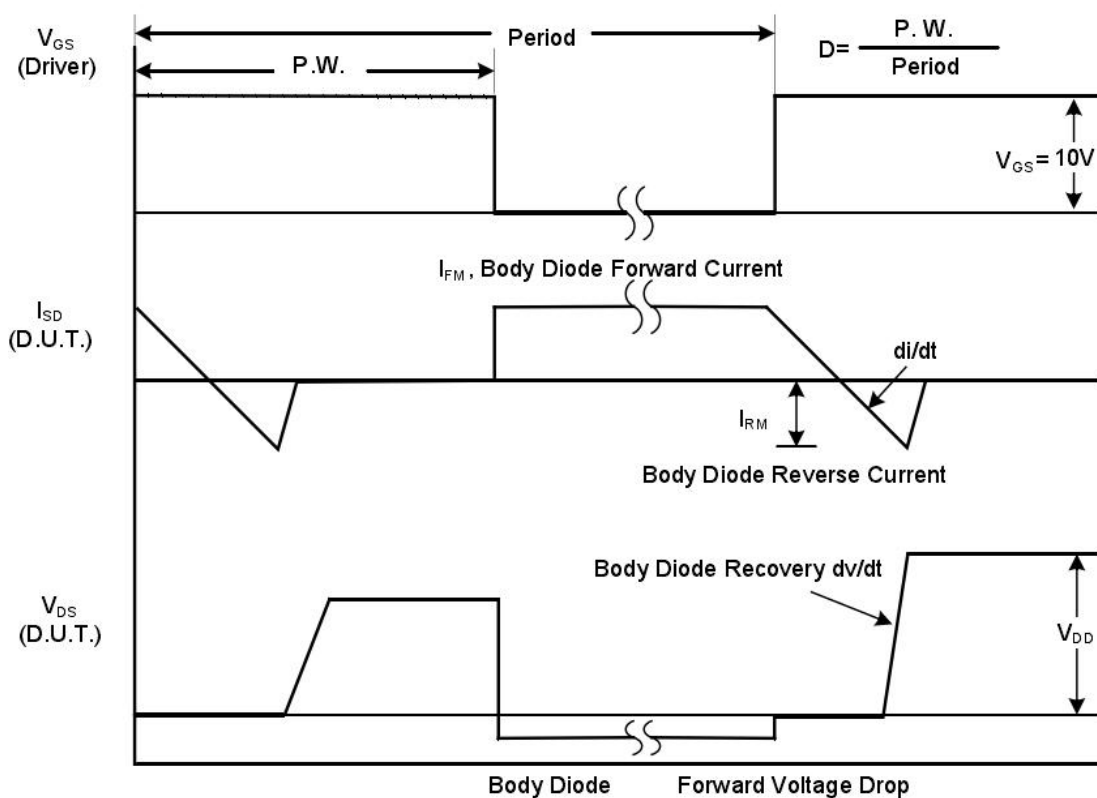
Notes

1. Repetitive Rating: pulse width limited by maximum junction temperature.
2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. A maximum of the $z_{th}(ch-tp)$ measured at Pingwei's test environment is only used for reference.
Be aware that the top-plate has the same electric potential as the sources; however, not intended for an Electrode.

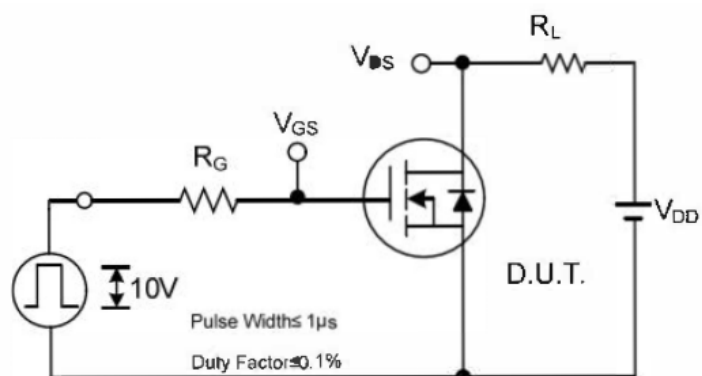
RATING AND CHARACTERISTIC CURVES



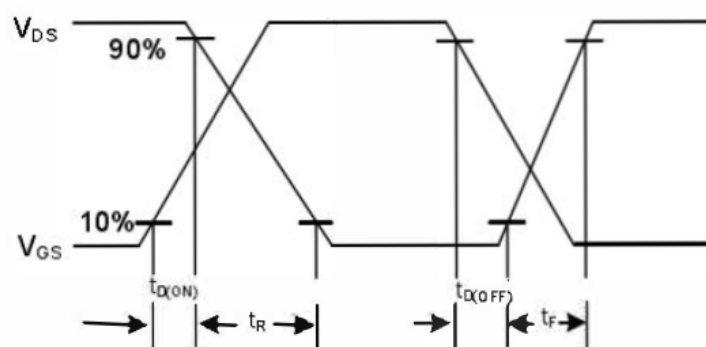
Peak Diode Recovery dv/dt Test Circuit



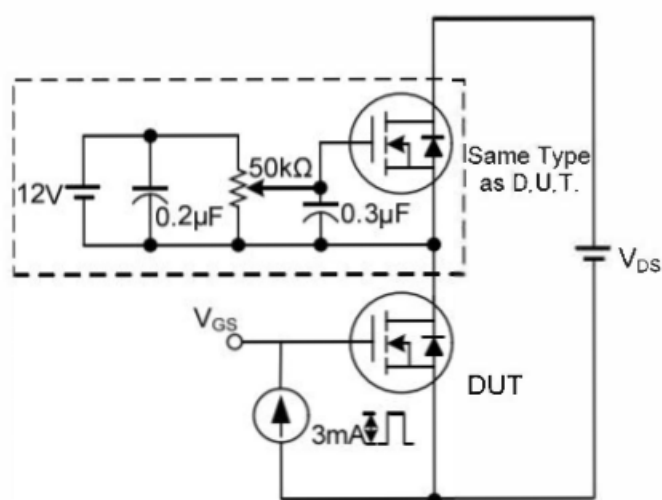
Peak Diode Recovery dv/dt Waveforms



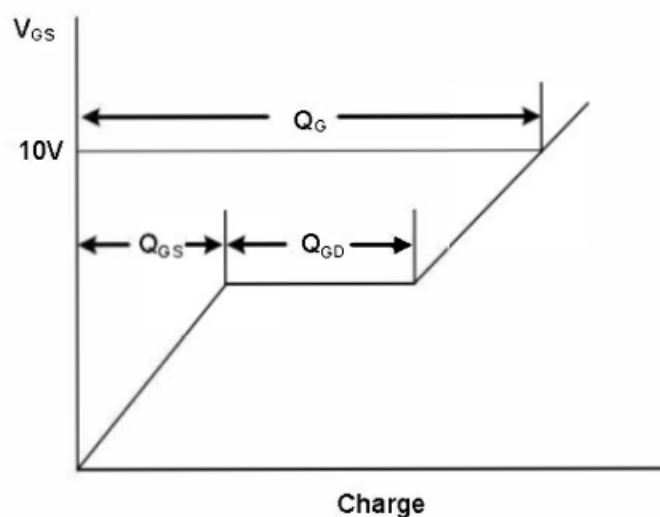
Switching Test Circuit



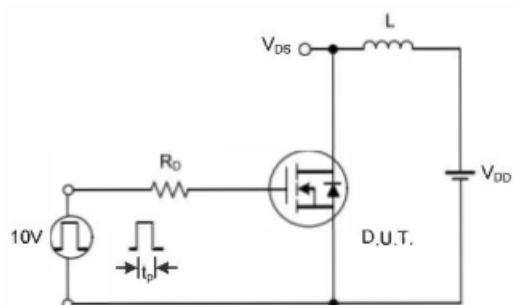
Switching Waveforms



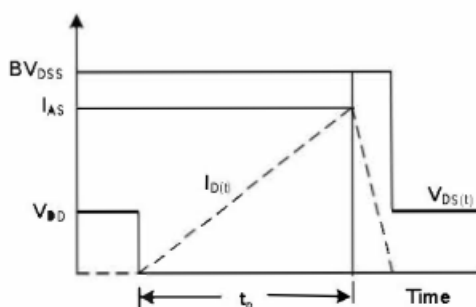
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

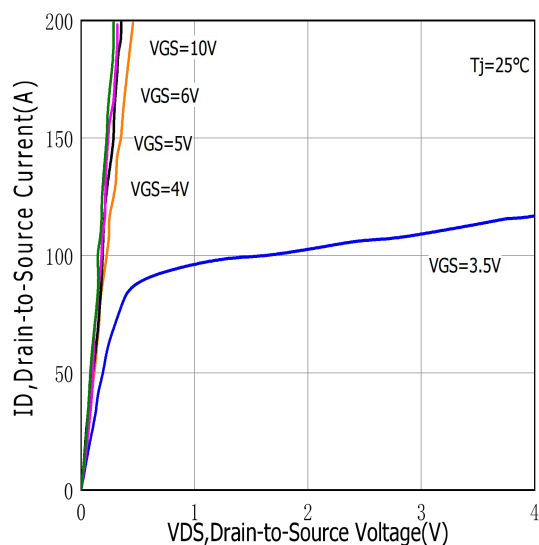
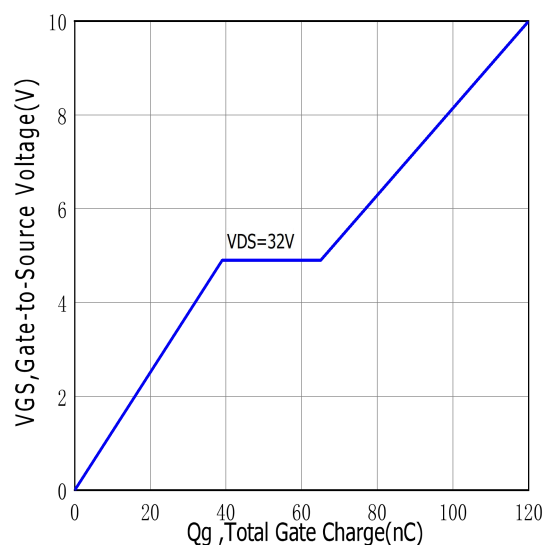
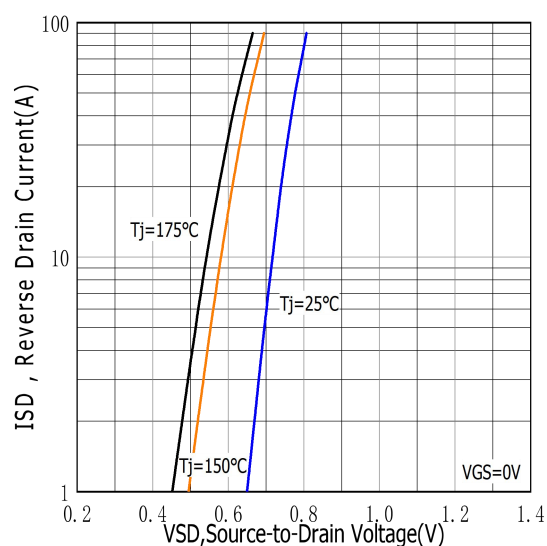
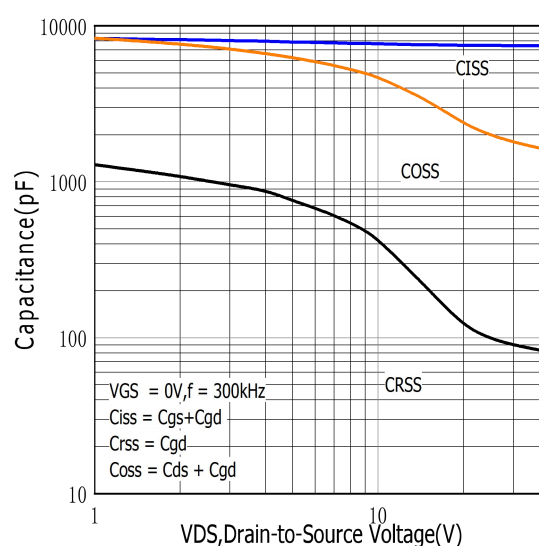
RATING AND CHARACTERISTIC CURVES
Figure.1 Typical Output Characteristics

Figure.2 Typical Gate Charge vs Gate to Source Voltage

Figure.3 Typical Body Diode Transfer Characteristics

Figure.4 Typical Capacitance vs Drain to Source Voltage


Figure.5 Typical Breakdown Voltage vs Junction Temperature

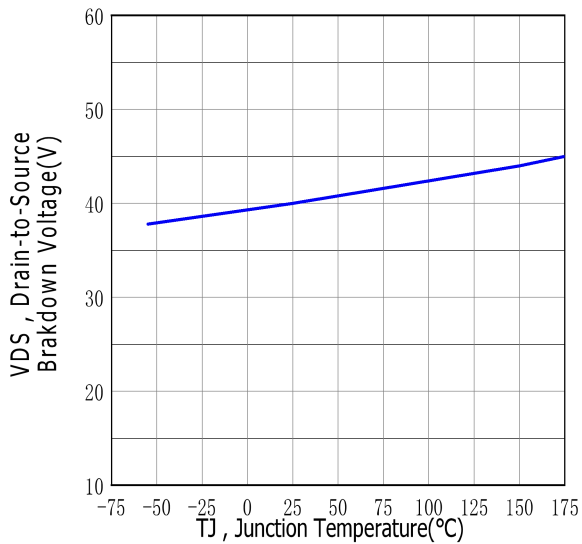


Figure.6 Typical Drain to Source on Resistance vs Junction Temperature

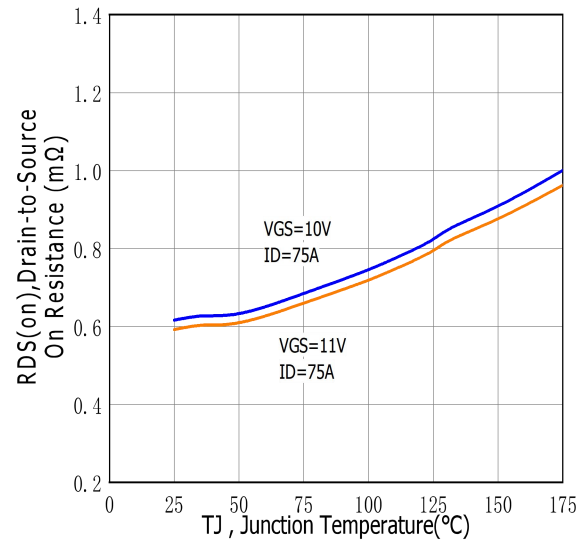


Figure.7 Maximum Forward Bias Safe Operating Area

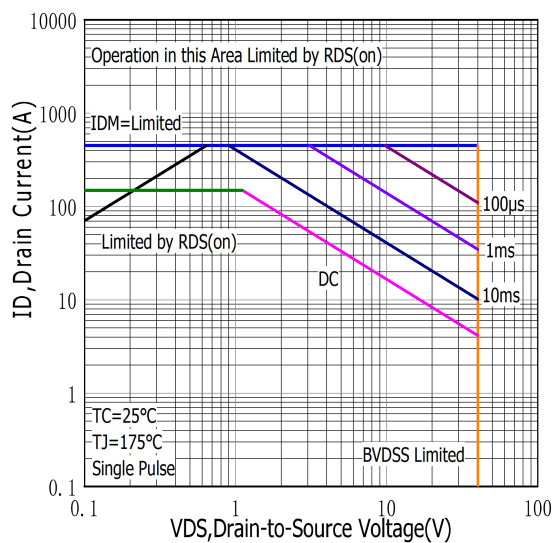


Figure.8 Typical Drain to Source ON Resistance vs Drain Current

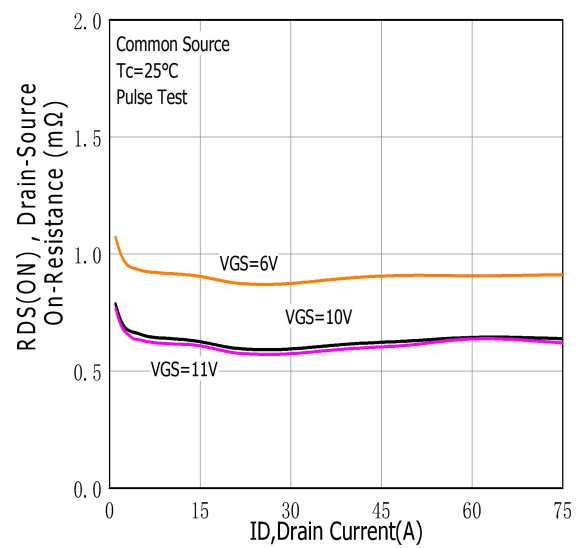


Figure.9 Maximum EAS vs Channel Temperature

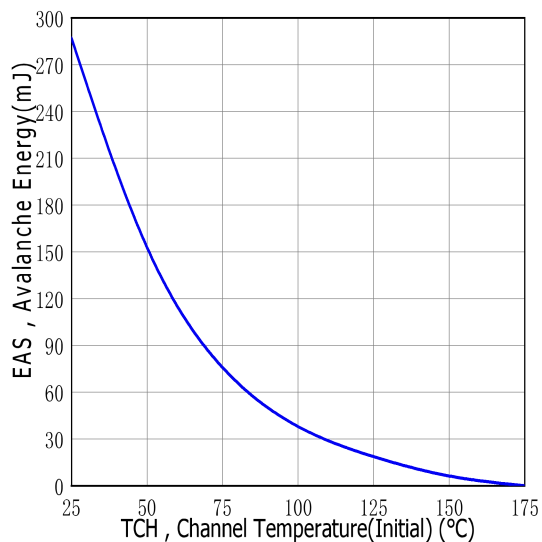


Figure.10 Typical Threshold Voltage vs Case Temperature

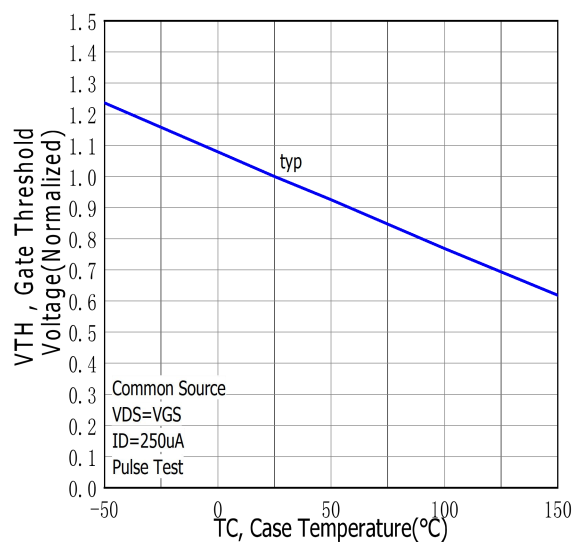


Figure.11 Typical Transfer Characteristics

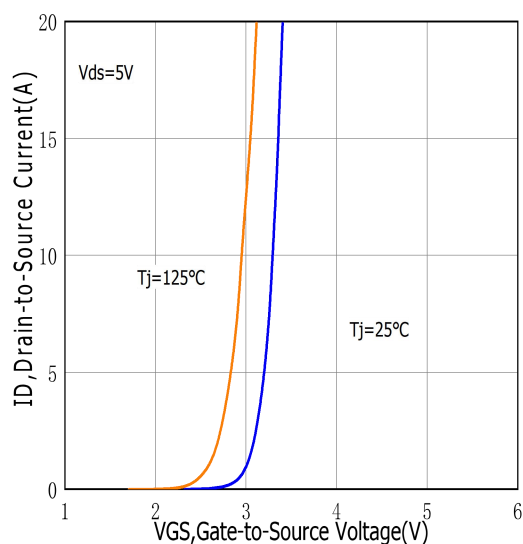


Figure.12 Maximum Power Dissipation vs Case Temperature

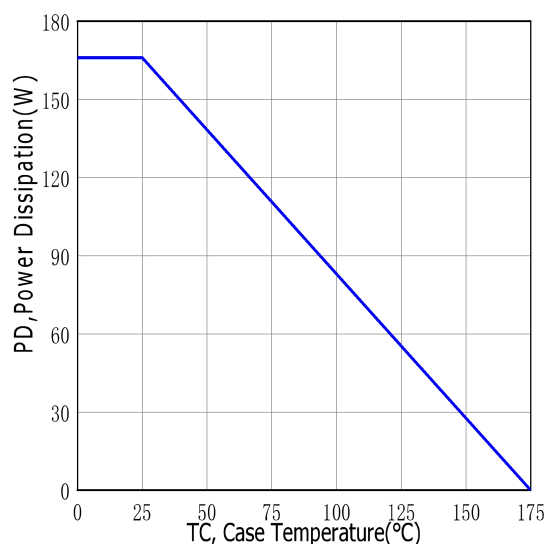


Figure.13 Maximum Drain Current vs. Case Temperature

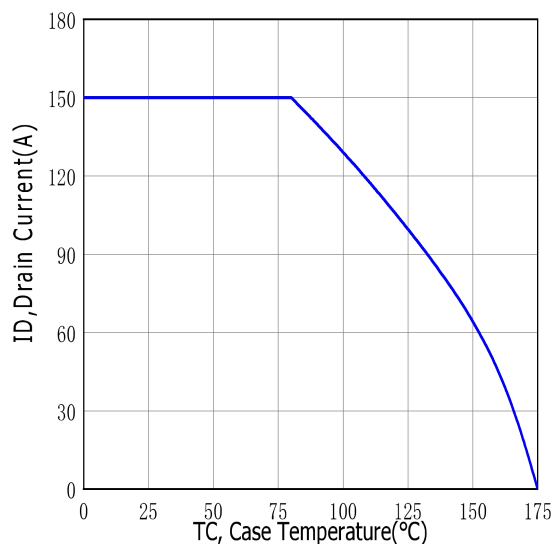


Figure.14 Maximum Effective Thermal Impedance, Junction to Case

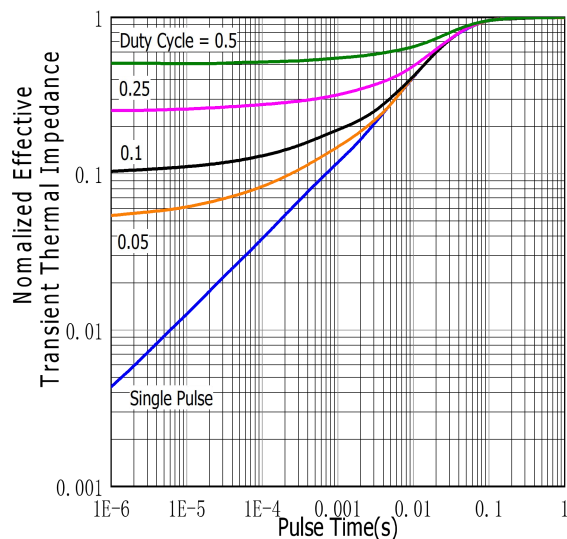


Figure.15 Typical Body Diode Transfer Characteristics

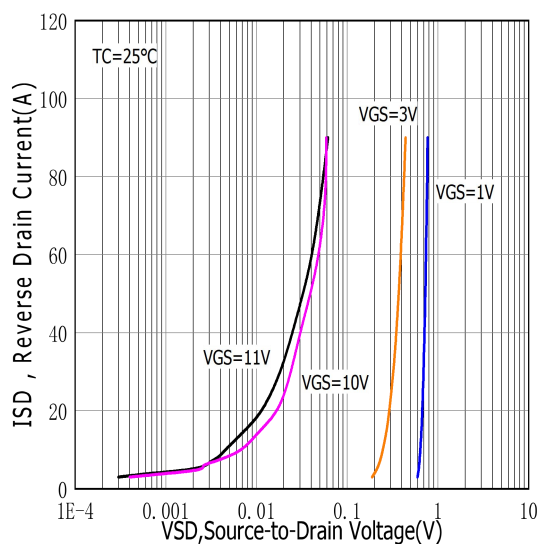
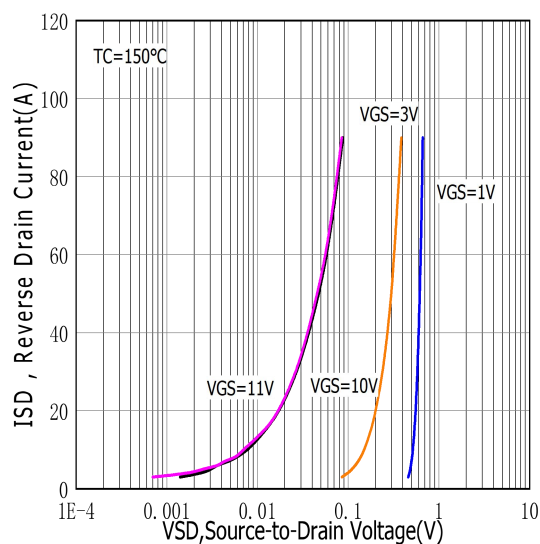
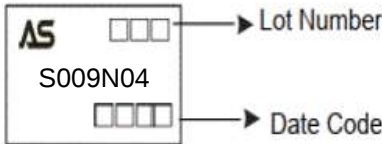


Figure.16 Typical Body Diode Transfer Characteristics



Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASS009N04Q1H	S009N04	PDFN5*6-8	Tape&Reel	4000/Reel

PACKAGE	MARKING
PDFN5*6-8	 AS □□□□ → Lot Number S009N04 □□□□ → Date Code

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