

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
100V	13mΩ@10V	40A
	16mΩ@4.5V	



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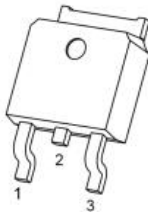
Feature

- Fast Switching
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

Applications

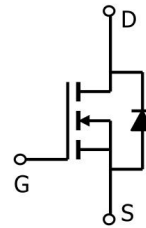
- Power switching application
- PWM Application
- DC-DC Converter

Package

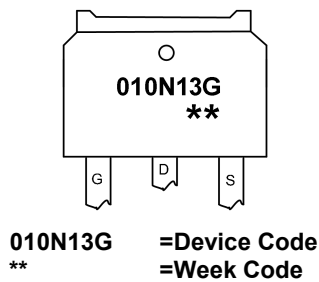


TO-252(1:G 2:D 3:S)

Circuit diagram



Marking



Order Information

Device	Package	Unite/Tape
SP010N13GTH	TO-252	2500

Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (Tc=25°C)	I_D	40	A
Pulsed Drain Current ²	I_{DM}	160	A
Single Pulse Avalanche Energy ³	E_{AS}	24	mJ
Total Power Dissipation ⁴ (Tc=25°C)	P_D	52	W
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	2.4	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID= 250uA	100	---	---	V
Drain-Source Leakage Current	IDSS	VDS= 80V , VGS=0V , TJ=25℃	---	---	1	uA
Gate-Source Leakage Current	IGSS	VGS= ±20V , VDS=0V	---	---	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID = 250uA	1.0	1.8	2.5	V
Static Drain-Source On-Resistance ²	RDS(ON)	VGS= 10V , ID= 10A	---	13	17	mΩ
		VGS= 4.5V , ID= 6A	---	16	21	
Dynamic Characteristics						
Input Capacitance	Ciss	VDS= 50V , VGS=0V , f=1MHz	---	770	---	pF
Output Capacitance	Coss		---	170	---	
Reverse Transfer Capacitance	Crss		---	5	---	
Switching Characteristics						
Total Gate Charge (4.5V)	Qg	VDS= 50V , VGS= 10V , ID= 10A	---	13	---	nC
Gate-Source Charge	Qgs		---	7	---	
Gate-Drain Charge	Qgd		---	3	---	
Turn-On Delay Time	Td(on)	VDD= 50V,ID= 10A, VGS= 10V,RGEN=6Ω	---	4.3	---	ns
Rise Time	Tr		---	5	---	
Turn-Off Delay Time	Td(off)		---	17	---	
Fall Time	Tf		---	9	---	
Source-Drain Diode Characteristics						
Diode Forward Voltage ²	VSD	VGS=0V , IS= -1A , TJ=25℃	---	---	1.2	V

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating . The test condition is $V_{DD}=50V, V_{GS}=10V, L=0.1mH, R_g=25\Omega$
- The power dissipation is limited by 150°C junction temperature

Typical Characteristics

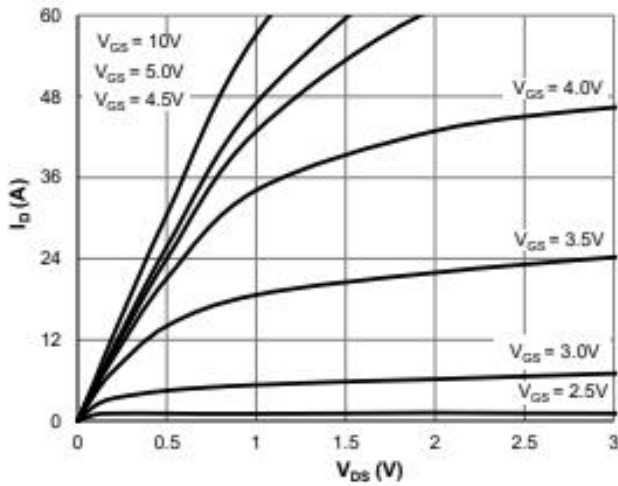


Figure 1: Saturation Characteristics

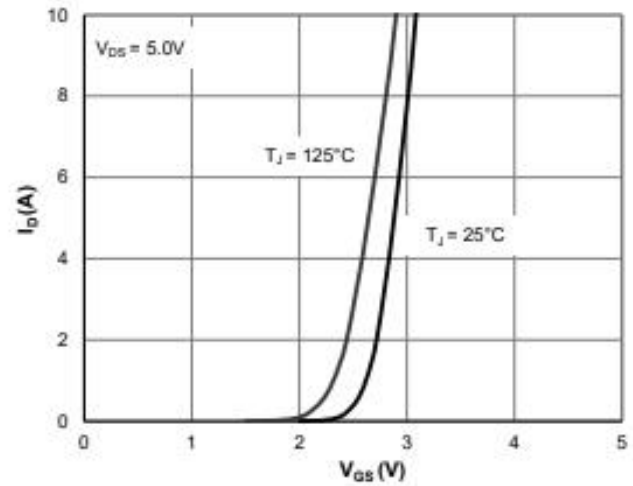


Figure 2: Transfer Characteristics

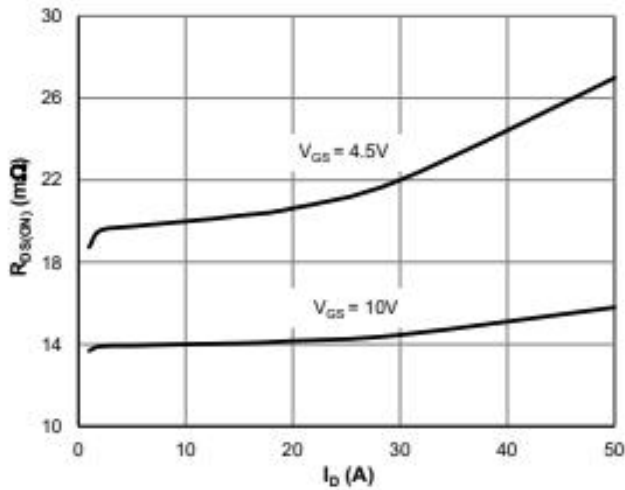


Figure 3: $R_{DS(ON)}$ vs. Drain Current

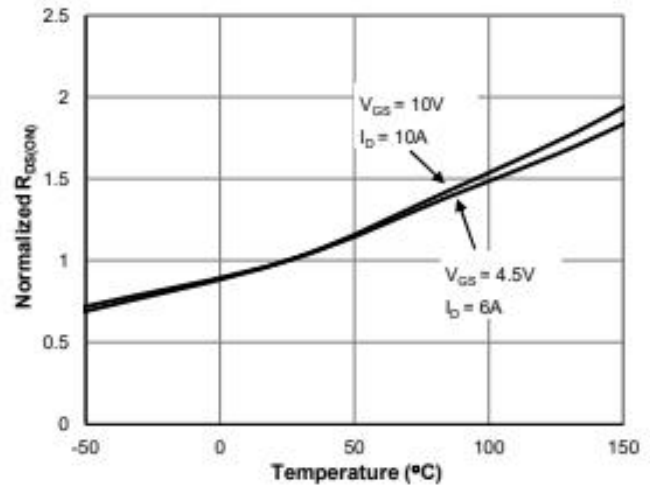


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

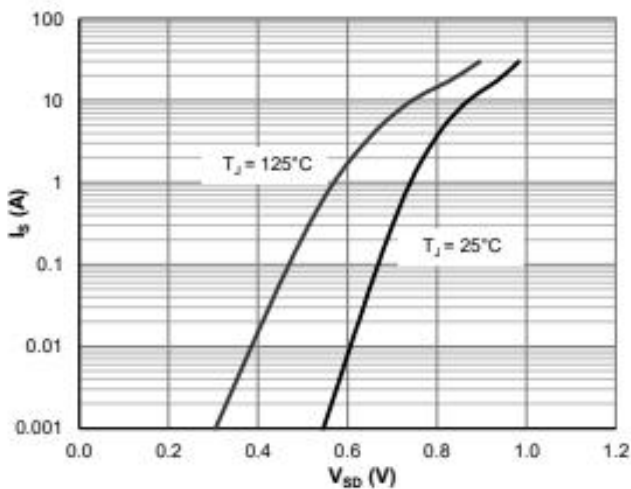


Figure 5: Body-Diode Characteristics

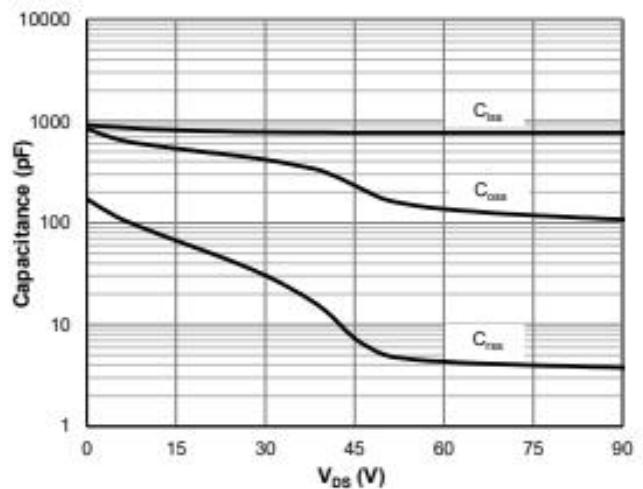


Figure 6: Capacitance Characteristics

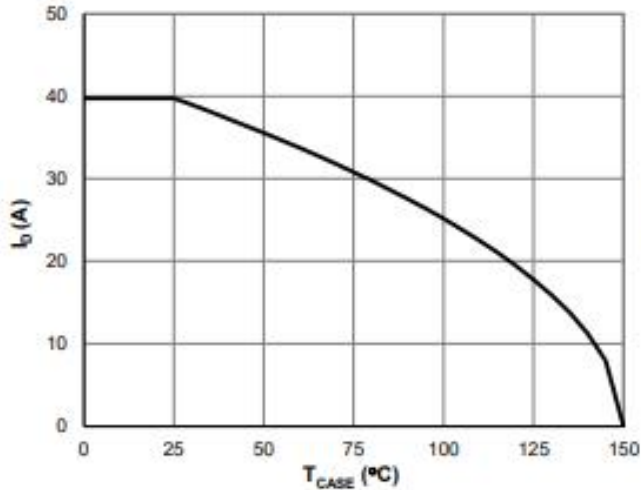


Figure 7: Current De-rating

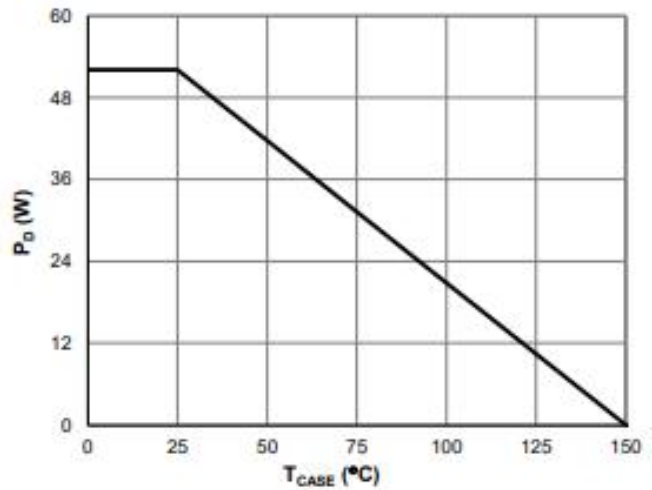


Figure 8: Power De-rating

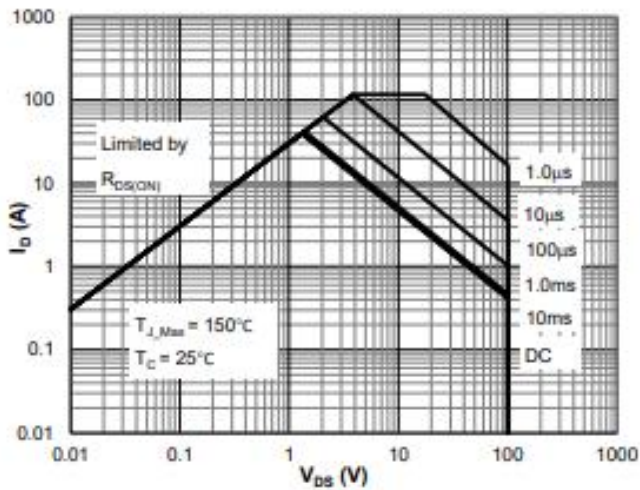


Figure 9: Maximum Safe Operating Area

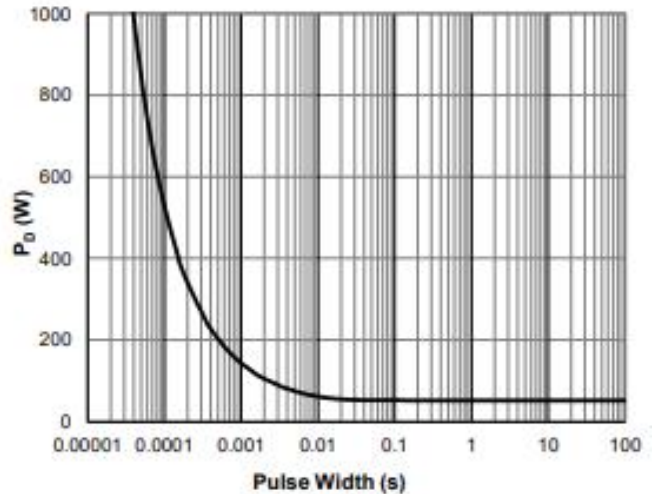


Figure 10: Single Pulse Power Rating, Junction-to-Case

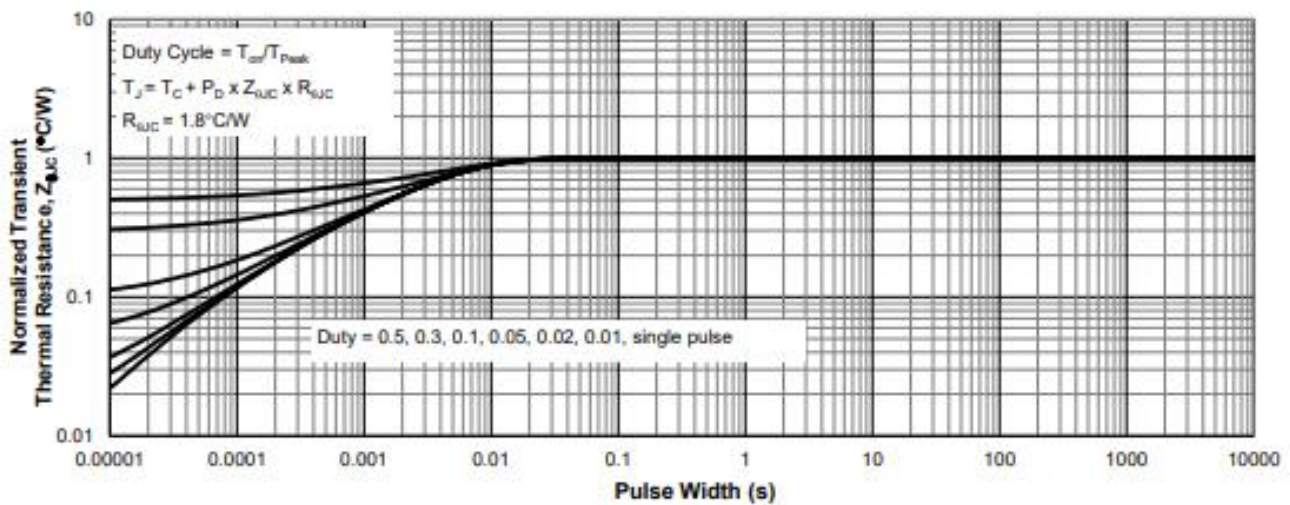
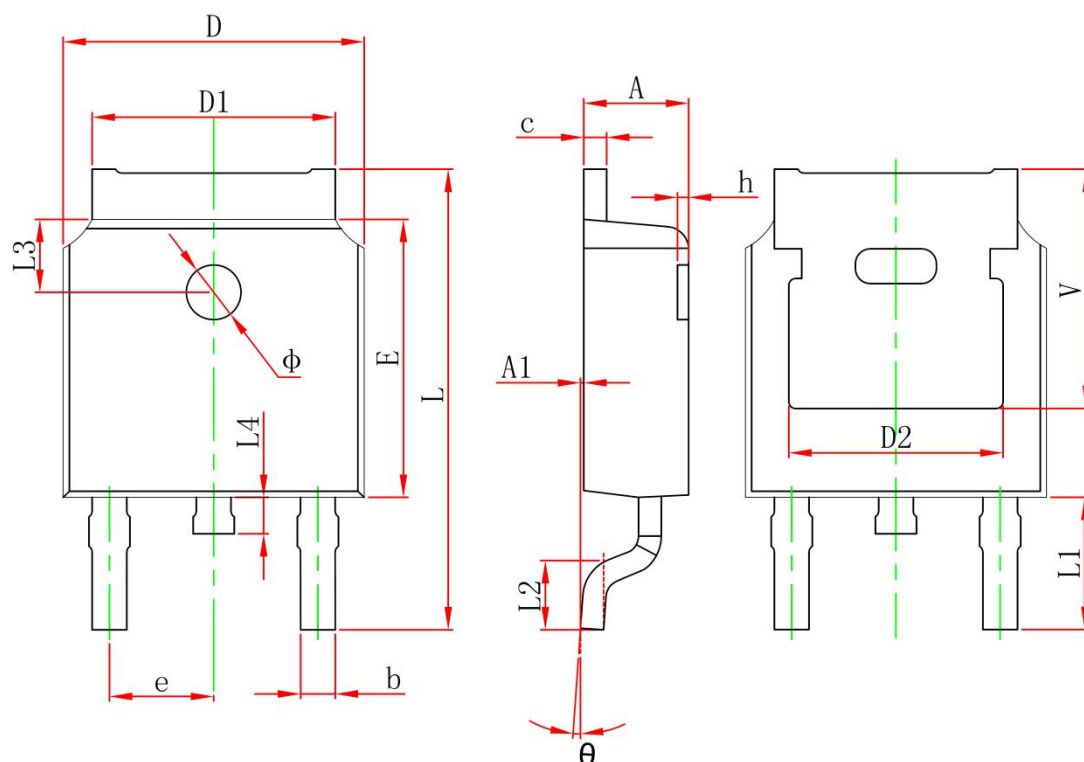


Figure 11: Normalized Maximum Transient Thermal Impedance

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	