

N-Channel 100 V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
100	2.9 @ $V_{GS} = 10V$	175 ⁽¹⁾

Features

- Low $R_{DS(on)}$ SGT technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

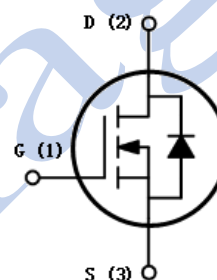
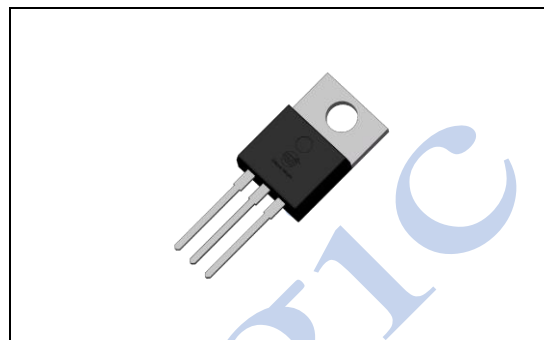
Applications

- DC/DC conversion
- Power switch
- Motor drives

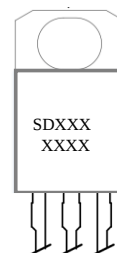
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Package and ordering information

Ordering code	Package	Device code
SDH10N2P9A-AB	TO220-3L	APO

TO220-3L


RoHS
COMPLIANT
HALOGEN
FREE



SDXXX
XXXX

Device code
Silicon Magic discrete device

XXXX
XXXX

Wafer lot number
Work week code
Year code

1. Maximum ratings

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

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current	I_D	$T_C = 25^\circ\text{C}$ ⁽¹⁾	175
		$T_C = 100^\circ\text{C}$	146
		$T_A = 25^\circ\text{C}$ ⁽⁴⁾	26.4
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	700	A
Avalanche energy, single pulse ⁽³⁾	E_{AS}	205	
Power dissipation	P_D	$T_C = 25^\circ\text{C}$	250
		$T_A = 25^\circ\text{C}$ ⁽⁴⁾	3.1
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

2. Thermal resistance ratings

Thermal resistance ratings						
Parameter		Symbol	Max.	Unit		
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.5			°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	Steady state	$R_{\theta JA}$	40			

3. Electrical Characteristics

Electrical characteristics						
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	100			V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.2	3.0	3.8	V
Gate-body leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$			1	μA
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 50\text{ A}$		2.3	2.9	m Ω
Forward transconductance ⁽⁵⁾	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 50\text{ A}$		123		S
Gate resistance	R_g	$f = 1\text{ MHz}$		2		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q_g	$V_{DS} = 50\text{ V}, I_D = 50\text{ A}, V_{GS} = 10\text{ V}$		176		nC
Gate-source charge	Q_{gs}			42		
Gate-drain charge	Q_{gd}			51		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 50\text{ V}, I_D = 50\text{ A}, V_{GS} = 10\text{ V},$ $R_{GEN} = 4.7\text{ }\Omega$		87		ns
Rise time	t_r			118		
Turn-off delay time	$t_{d(off)}$			116		
Fall time	t_f			106		
Input capacitance	C_{iss}	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		10000		pF
Output capacitance	C_{oss}			1340		
Reverse transfer capacitance	C_{rss}			53		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_F = 50\text{ A}$		0.86	1.2	V
Reverse recovery time	t_{rr}	$V_{DS} = 50\text{ V}, I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		96		ns
Reverse recovery charge	Q_{rr}			210		nC

Notes

- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, L = 0.1\text{ mH}$.
- (4) $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.
- (5) Guaranteed by design, not subject to production testing.

4. Electrical characteristics diagrams

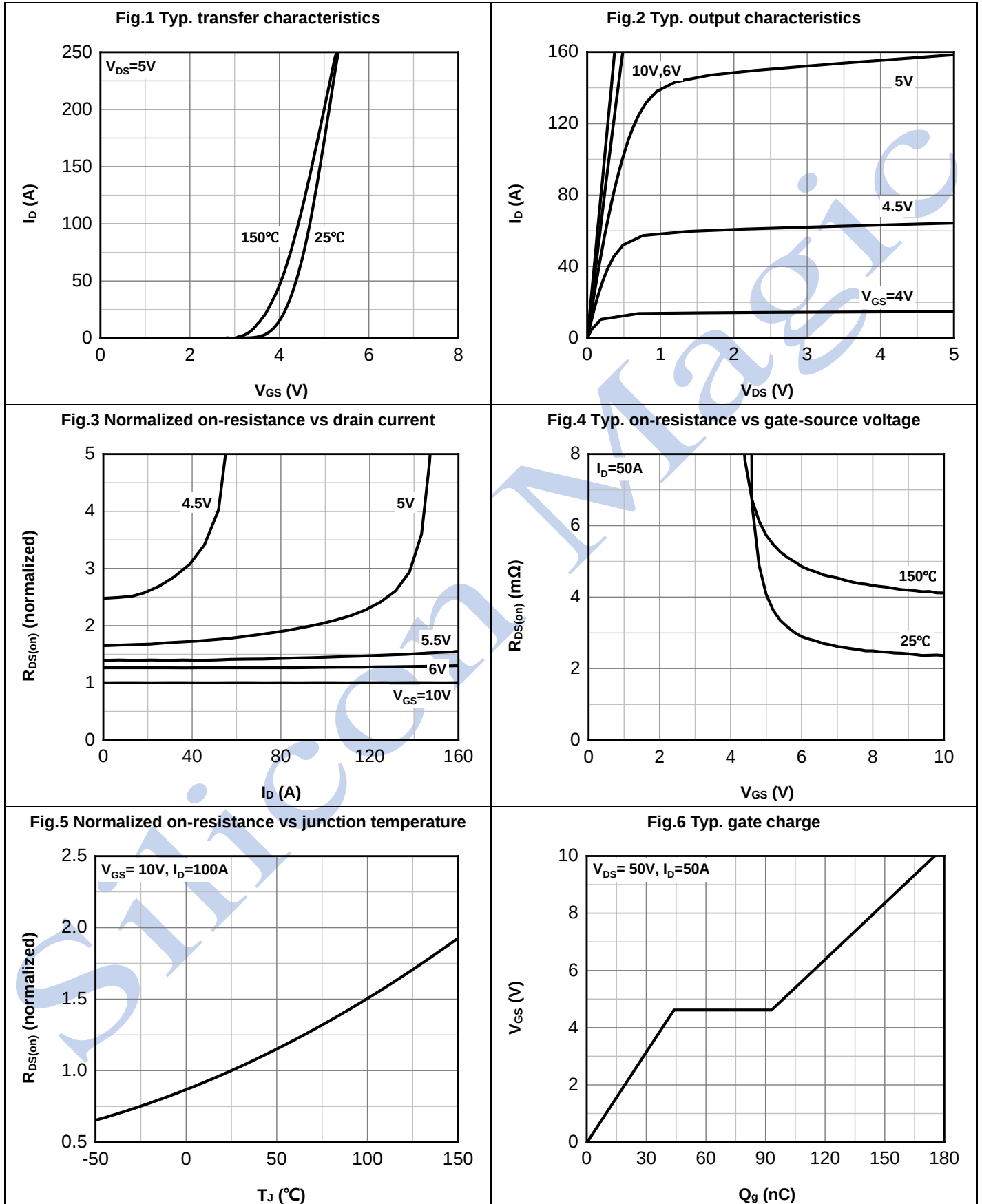


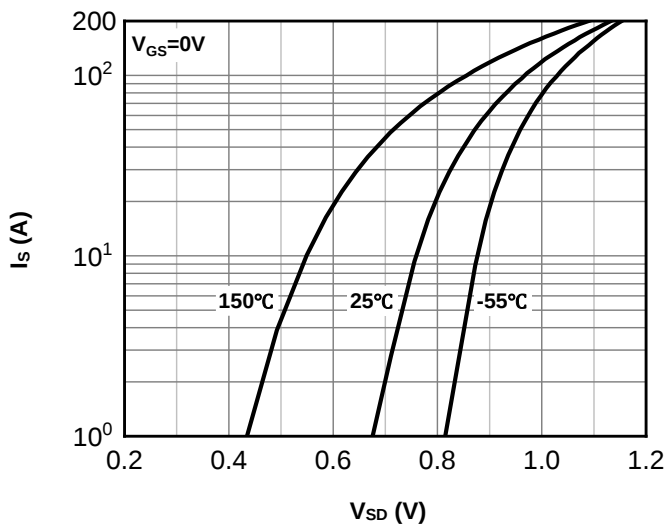
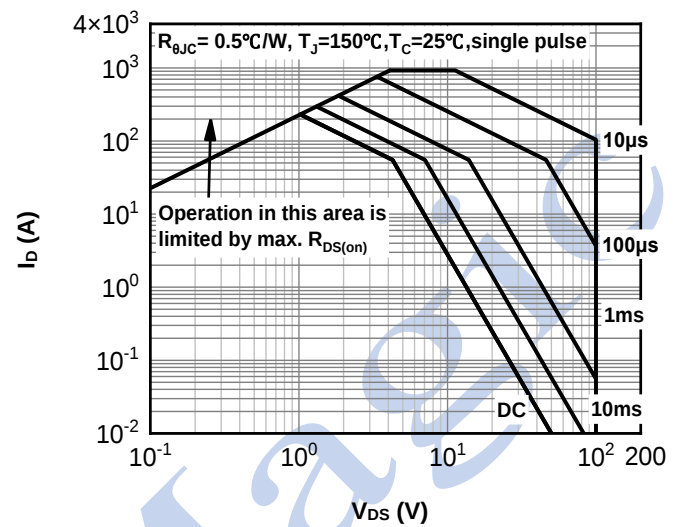
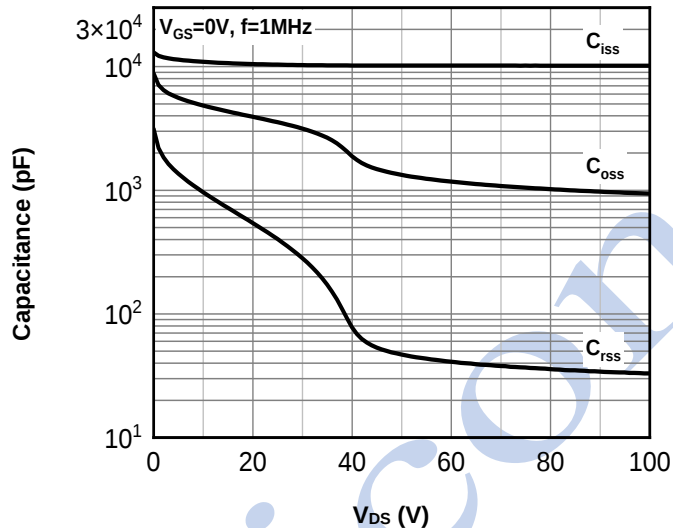
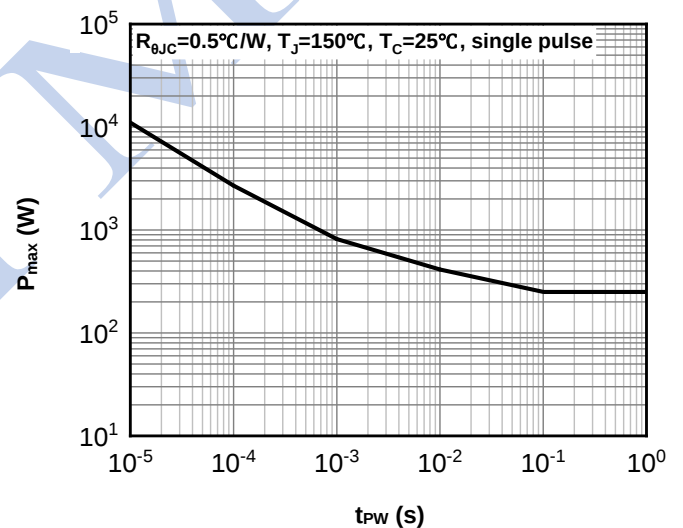
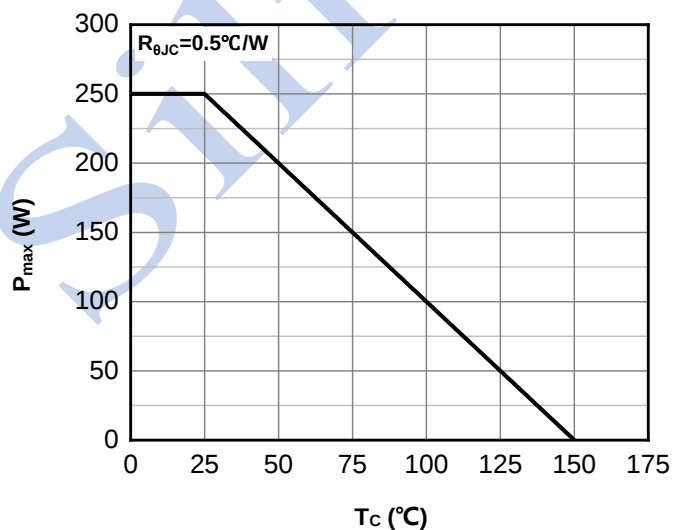
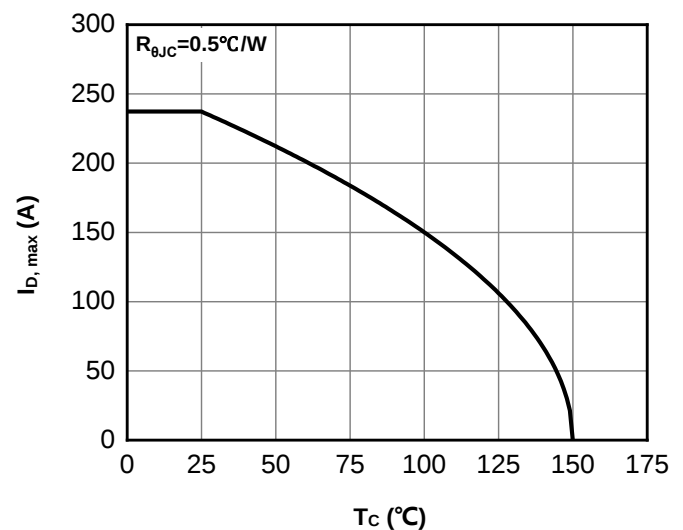
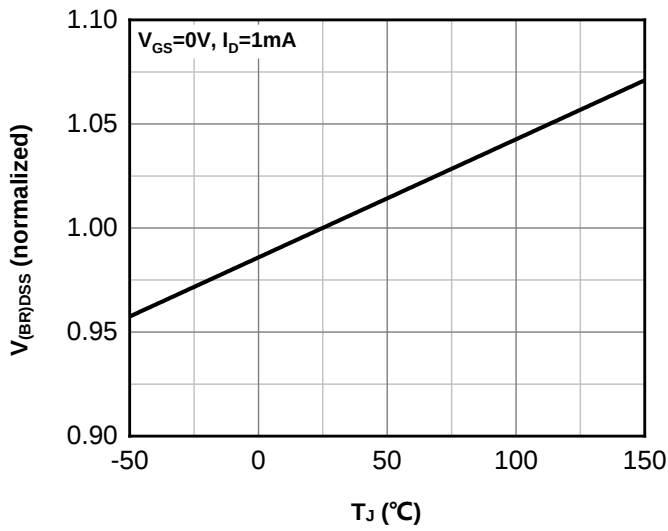
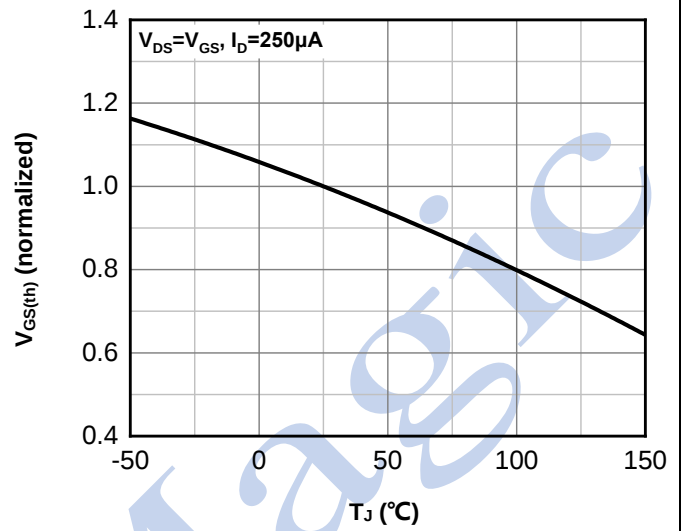
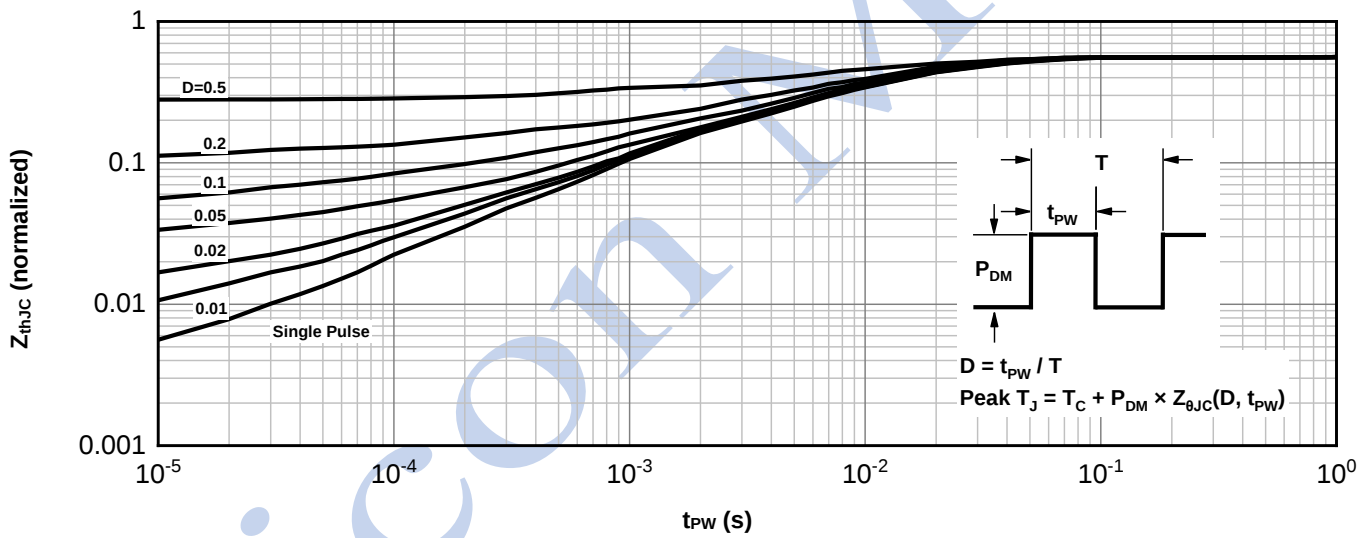
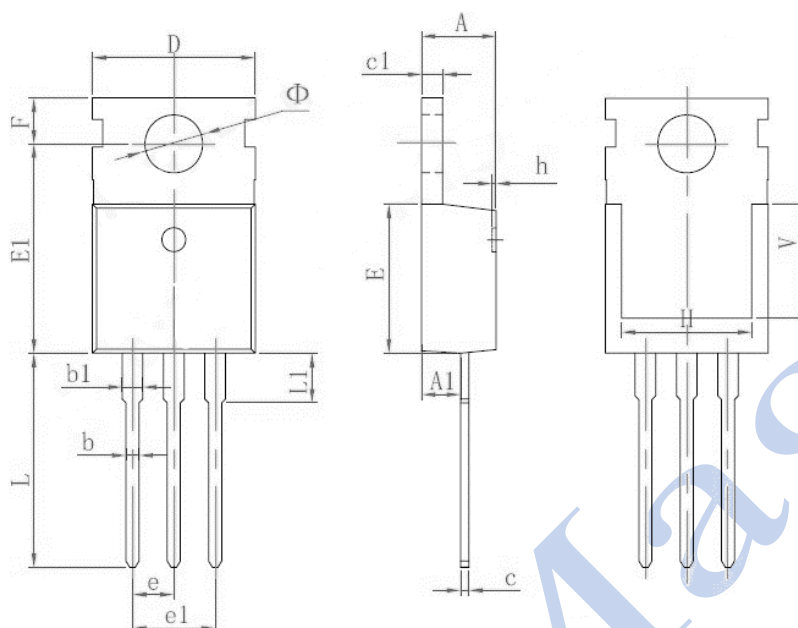
Fig.7 Typ. forward characteristics of body diode

Fig.8 Safe operating area

Fig.9 Typ. Capacitance

Fig.10 Single pulse maximum power dissipation

Fig.11 Max. power dissipation vs case temperature

Fig.12 Max. continuous drain current vs case temperature


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

Fig.15 Normalized transient thermal impedance from junction to case


5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	4.400	—	4.600
A1	2.250	—	2.550
b	0.710	—	0.910
b1	1.170	—	1.370
c	0.330	—	0.650
c1	1.200	—	1.400
D	9.910	—	10.250
E	8.950	—	9.750
E1	12.650	—	13.050
e	2.540 TYP		
e1	4.980	—	5.180
F	2.650	—	2.950
H	7.900	—	8.100
h	0.000	—	0.300
L	12.900	—	13.400
L1	2.850	—	3.250
V	6.900 REF		
φ	3.400	—	3.800

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