

Dual N-channel Enhancement Mode Power MOSFET

Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- 100% UIS TESTED!
- 100% ΔV_{ds} TESTED!

Product Summary

Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th)_{Typ}}$	1.65	V
$I_D(@V_{GS}=10V)$	40	A
$R_{DS(ON)_{Typ}}(@V_{GS}=10V)$	7.6	$m\Omega$

Applications

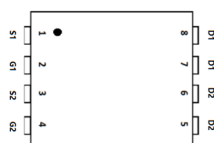
- Load Switch
- PWM Application
- Power Management

Top View

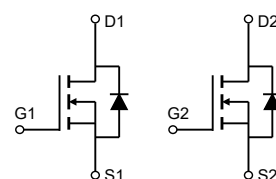
Bottom View



PDFN5x6-8L



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK30N40DG	30N40D	DFN5x6	Reel	N/A	N/A	5000

MAXIMUM RATINGS ($T_a=25^{\circ}C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}C$	I_D	40	A
	$T_C = 100^{\circ}C$		25	
Pulsed Drain Current		I_{DM}	Refer to Fig.4	A
Single Pulsed Avalanche Energy		E_{AS}	43	mJ
Power Dissipation		P_D	21	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	58	$^{\circ}C/W$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	V _{(BR) DSS}	V _{GS} = 0V, I _D = 250μA	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 30V, V _{GS} =0V			1.0	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} =±20V			±100	nA
On characteristics						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	1.65	2.5	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		7.6	10	mΩ
		V _{GS} =4.5V, I _D =15A		11.5	17	mΩ
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V f =1MHz		1232		pF
Output capacitance	C _{oss}			157		
Reverse transfer capacitance	C _{rss}			127		
Switching characteristics						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =15V, I _D =20A		25		nC
Gate-source charge	Q _{gs}			4		
Gate-drain charge	Q _{gd}			5		
Turn-on delay time	t _{d(on)}	V _{DD} =15V, I _D =20A V _{GS} =10V, R _{GEN} =3Ω		6		ns
Turn-on rise time	t _r			11		
Turn-off delay time	t _{d(off)}			26		
Turn-off fall time	t _f			7		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Continuous drain-source diode forward current	I _S				40	A
Pulsed Source Current	I _{SM}				162	A
Reverse recovery time	t _{rr}	di/dt = 100A/μs, I _F = 20A		9		ns
Reverse recovery charge	Q _{rr}			2.3		nC

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- 2.EAS condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 15V$, $V_{GS} = 10V$, $R_G = 25\Omega$, $L = 0.5mH$, $I_{AS} = 13.3A$, $V_{DD} = 0V$ during time in avalanche.
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.
- 4.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

Typical Characteristics

Figure 1: Power De-rating

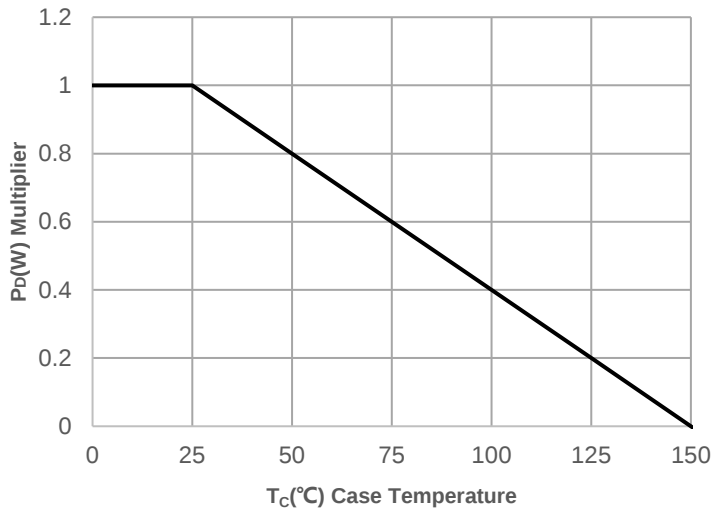


Figure 2: Current De-rating

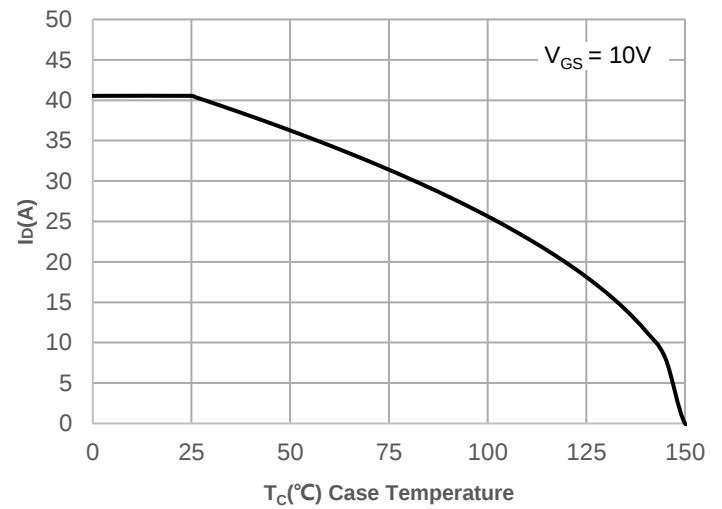


Figure 3: Normalized Maximum Transient Thermal Impedance

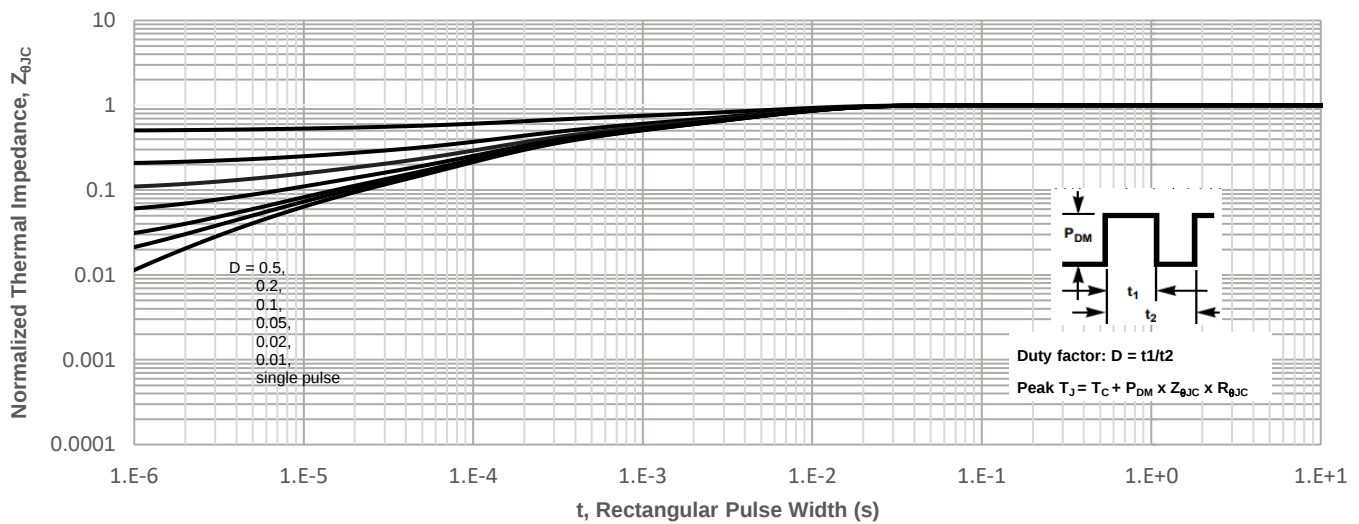
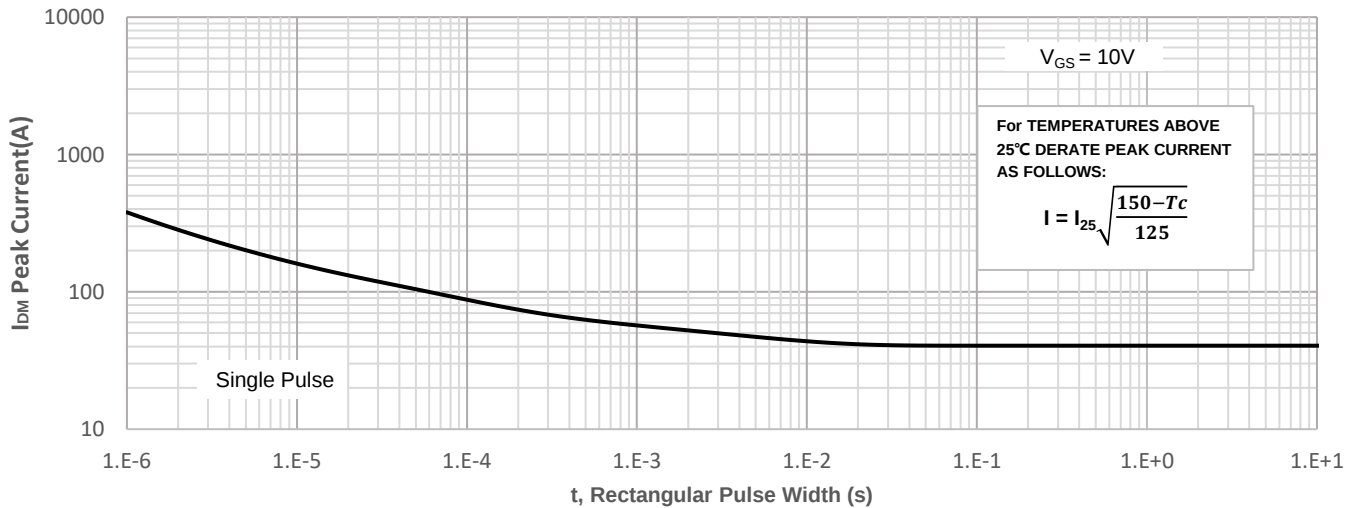


Figure 4: Peak Current Capacity



Typical Characteristics

Figure 5: Output Characteristics

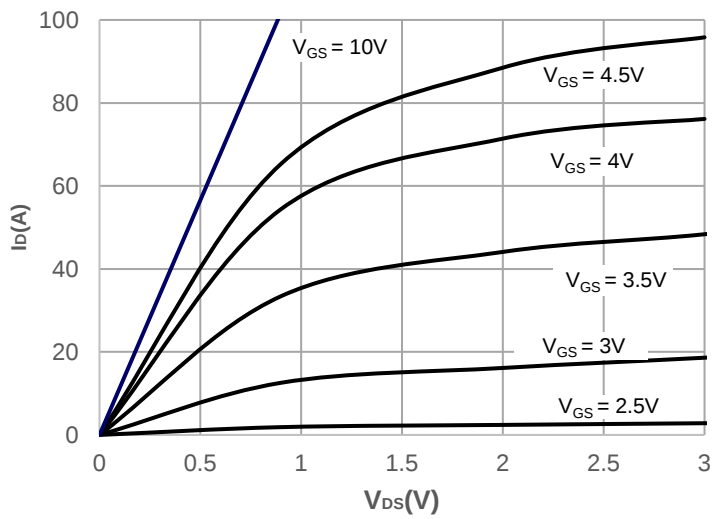


Figure 6: Typical Transfer Characteristics

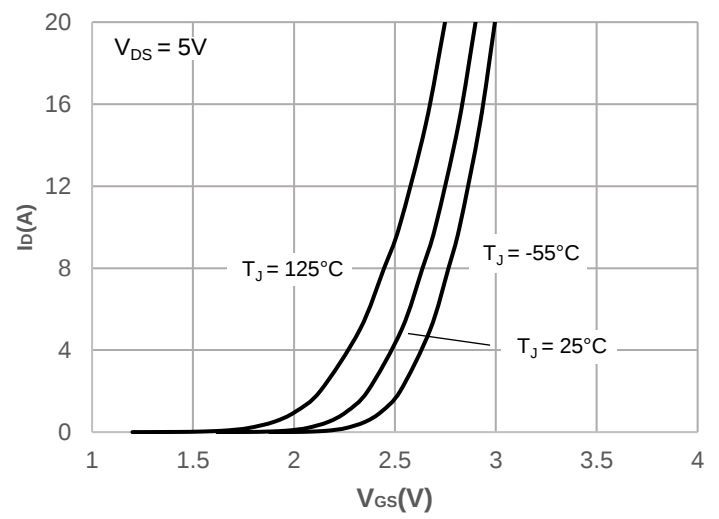


Figure 7: On-resistance vs. Drain Current

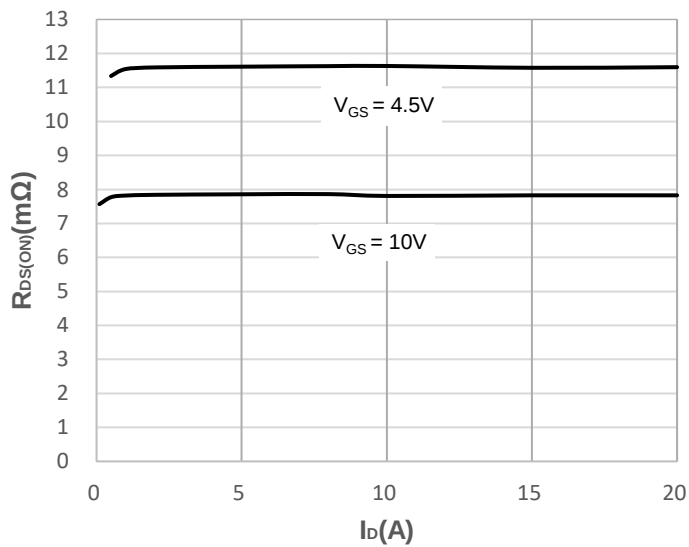


Figure 8: Body Diode Characteristics

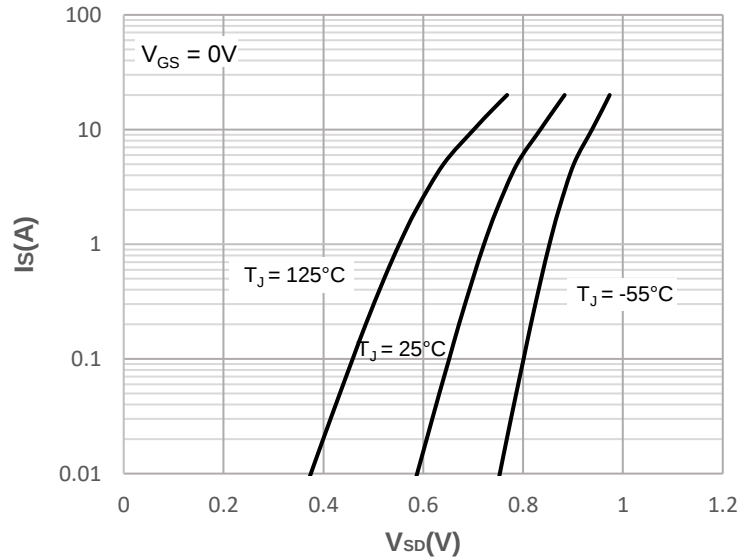


Figure 9: Gate Charge Characteristics

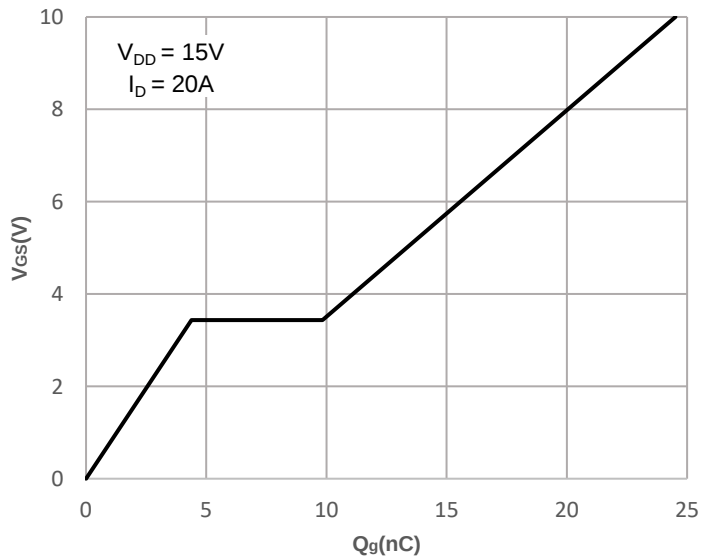
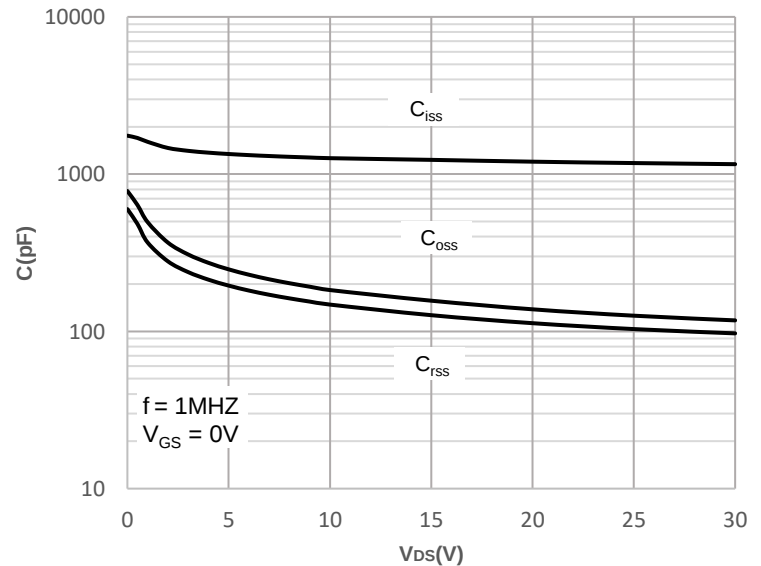


Figure 10: Capacitance Characteristics



Typical Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

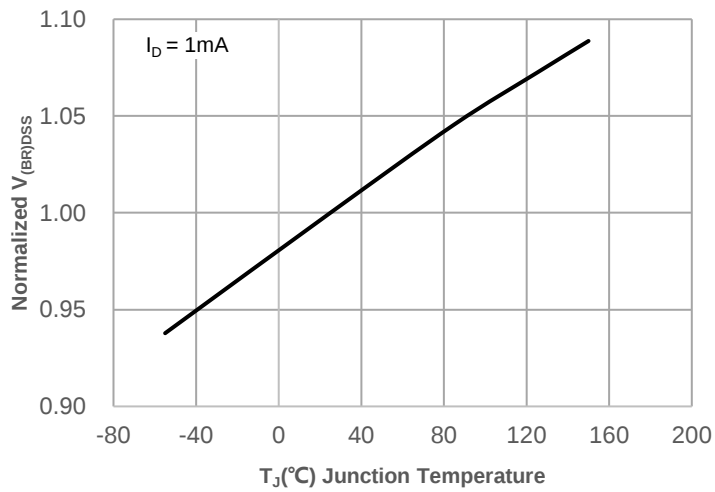


Figure 12: Normalized on Resistance vs. Junction Temperature

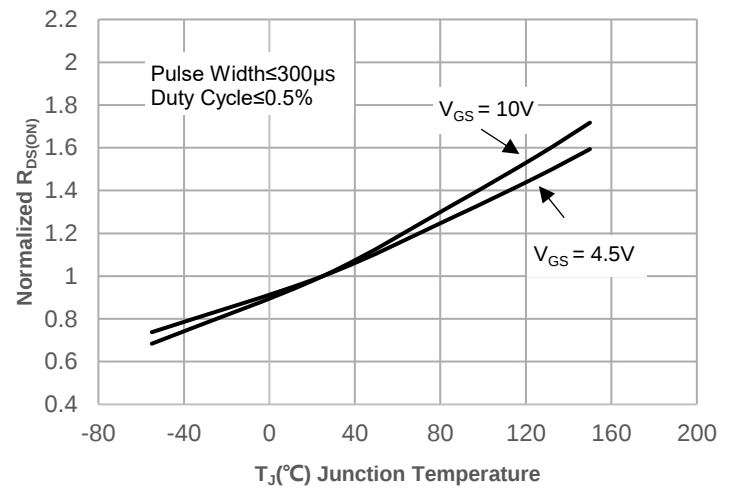


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

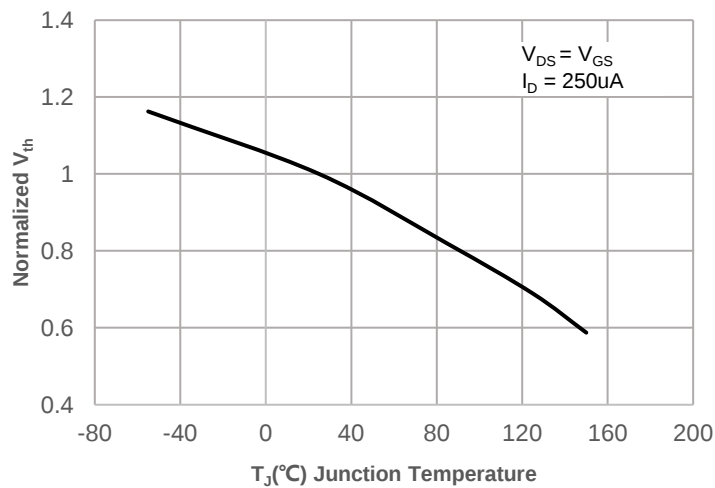


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

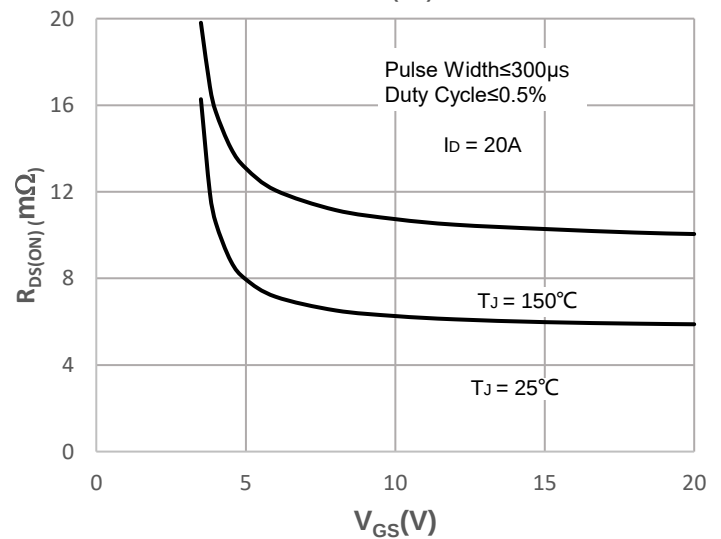
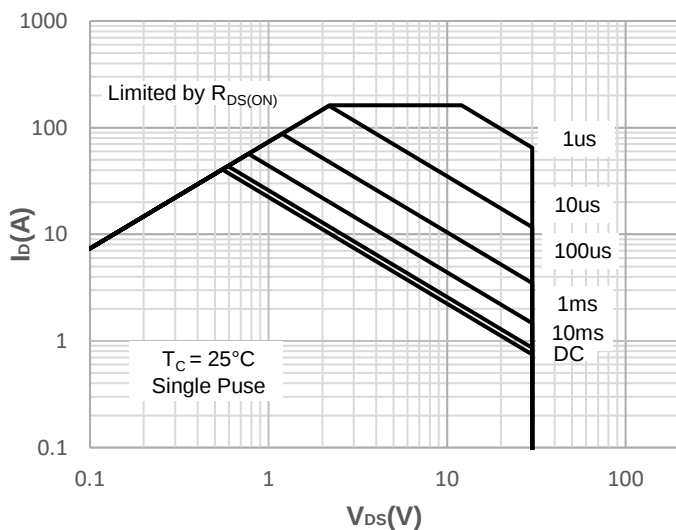
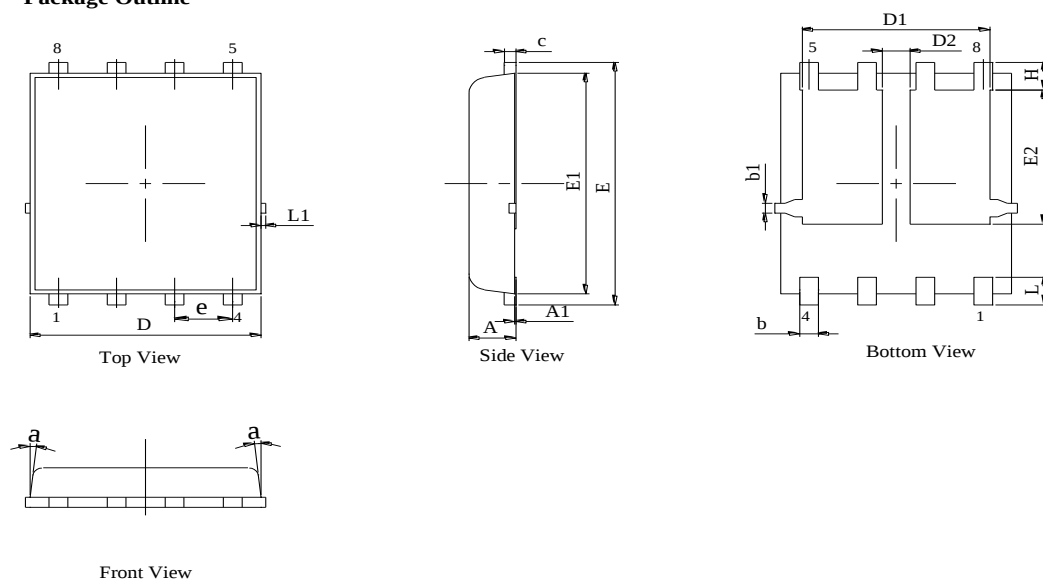


Figure 15: Maximum Safe Operating Area



Package Outline

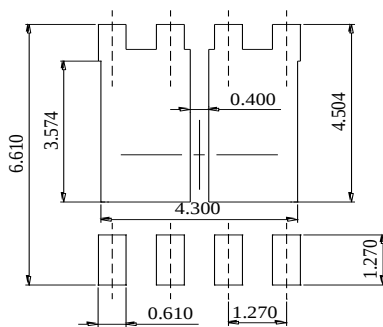


NOTES:

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	1.00	1.10
A1	0.00	-	0.10
b	0.31	0.41	0.51
b1	0.15	0.25	0.35
c	0.23	-	0.33
D	4.95	5.05	5.15
D1	4.00	4.10	4.20
D2	0.50	0.60	0.70
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.31	3.41	3.51
e	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
L1	-	-	0.125
a	-	-	12°

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS