

Features

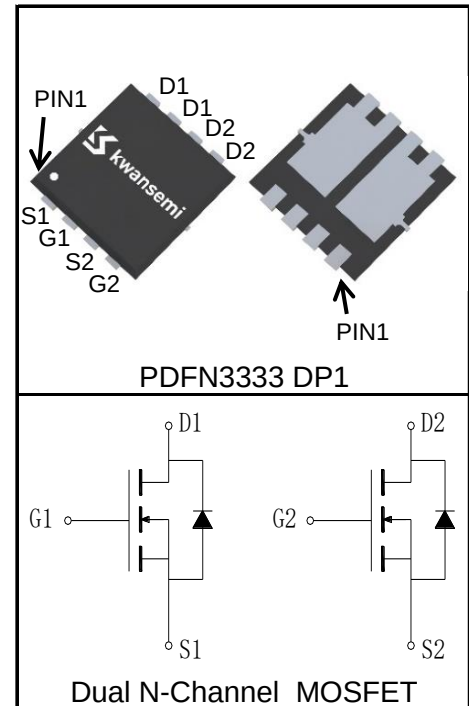
- 60V/29A
- $R_{DS(ON)} = 12m\Omega(Typ.)@V_{GS}=10V$
- $R_{DS(ON)} = 16m\Omega(Typ.)@V_{GS}=4.5V$
- $R_{DS(ON)} = 20m\Omega(Typ.)@V_{GS}=3.3V$
- Excellent $Q_G \times R_{DS(on)}$ product(FOM)
- SGT Technology
- Fast Switching Speed
- 100% avalanche tested

Applications

- Switching Application Systems



Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		60	V
V _{GSS}	Gate-Source Voltage		±20	
T _{Jmax}	Maximum Junction Temperature		150	°C
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	27	A
Mounted on Large Heat Sink				
I _{DP} ^①	Pulse Drain Current	T _C =25°C	116	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =10V)	T _C =25°C	29	A
		T _C =100°C	18	
	Continuous Drain Current@T _A (V _{GS} =10V) ^③	T _A =25°C	10	
		T _A =70°C	8	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	21	W
		T _C =100°C	8	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	2.8	
		T _A =70°C	1.8	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	5.7	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	45	°C/W
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	56	mJ

Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

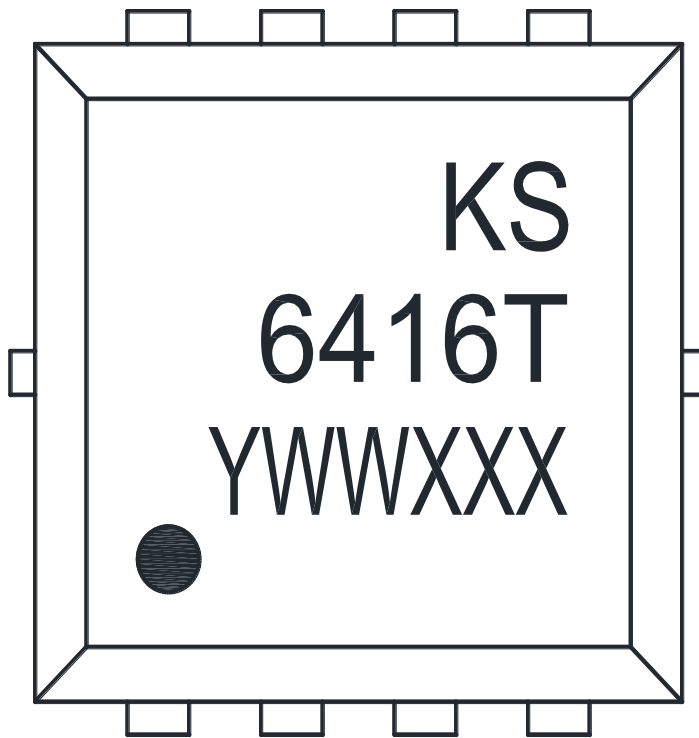
Symbol	Parameter	Test Condition	KS6416MAT			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V			1	μA
		T _J =125°C			30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.9	1.3	1.6	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^⑤	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =15A		12	15	mΩ
		V _{GS} =4.5V, I _{DS} =10A		16	20	mΩ
		V _{GS} =3.3V, I _{DS} =6A		20	26	mΩ
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =15A, V _{GS} =0V		0.9	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =15A, dI _{SD} /dt=100A/μs		32		ns
Q _{rr}	Reverse Recovery Charge			57		nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz		1.6		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Frequency=1.0MHz		640		pF
C _{oss}	Output Capacitance			170		
C _{rss}	Reverse Transfer Capacitance			6		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, I _{DS} =15A, V _{GS} =10V,R _G =3Ω		10		ns
t _r	Turn-on Rise Time			12		
t _{d(OFF)}	Turn-off Delay Time			29		
t _f	Turn-off Fall Time			14		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =10V, I _{DS} =15A		13		nC
Q _{gs}	Gate-Source Charge			1.8		
Q _{gd}	Gate-Drain Charge			2.8		

Notes:

- ①Pulse width limited by safe operating area.
- ②Calculated continuous current based on maximum allowable junction temperature.
- ③When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
- ④Limited by $T_{J\text{max}}$, Starting $T_J = 25^\circ\text{C}$, $I_{AS\text{max}} = 15\text{A}$, $L = 0.5\text{mH}$, $V_{DD} = 48\text{V}$, $R_G = 25\Omega$, $V_{GS} = 10\text{V}$. Part not recommended for use above this value. 100% Final Test at $I_{AS} = 8\text{A}$, $L = 0.5\text{mH}$.
- ⑤Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- ⑥Guaranteed by design, not subject to production testing.

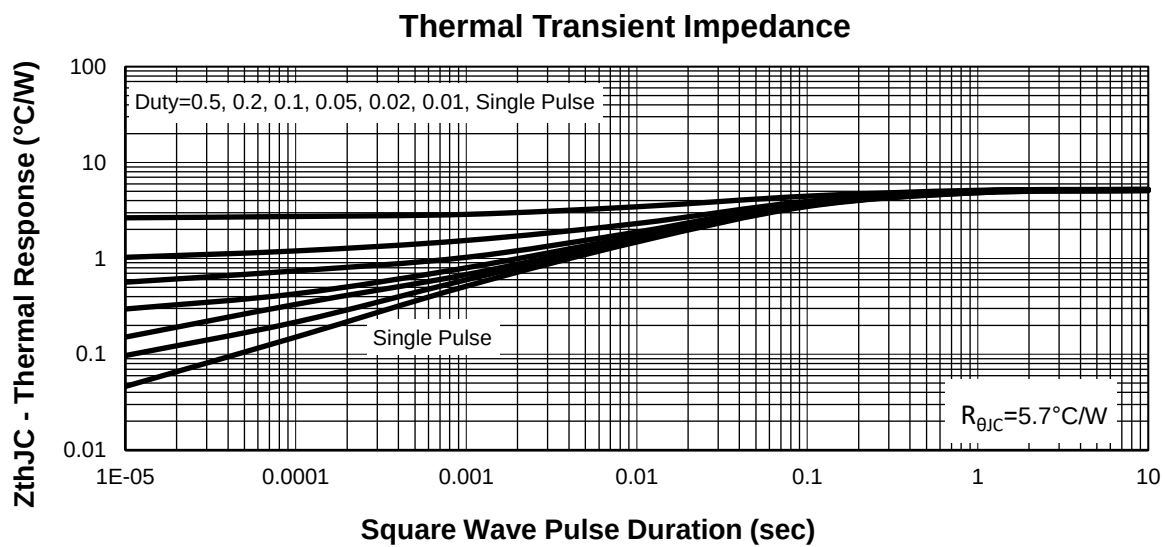
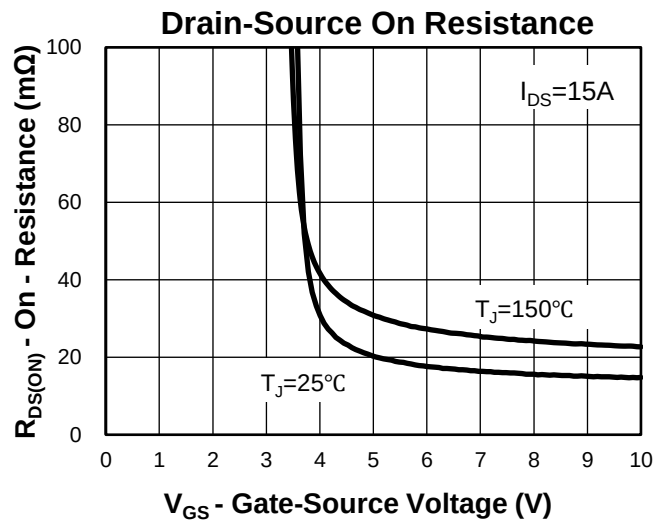
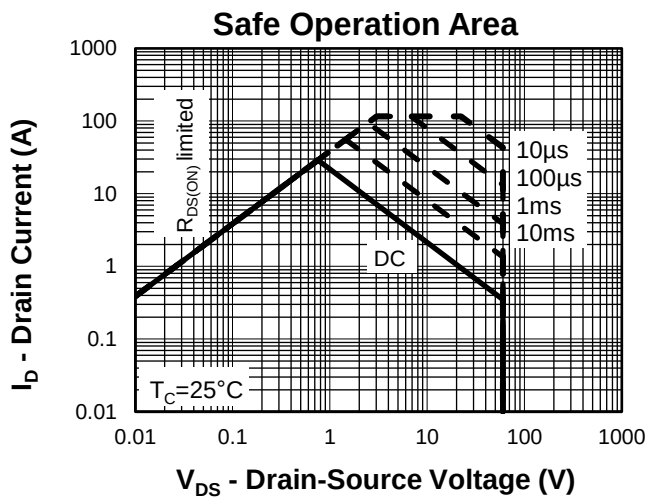
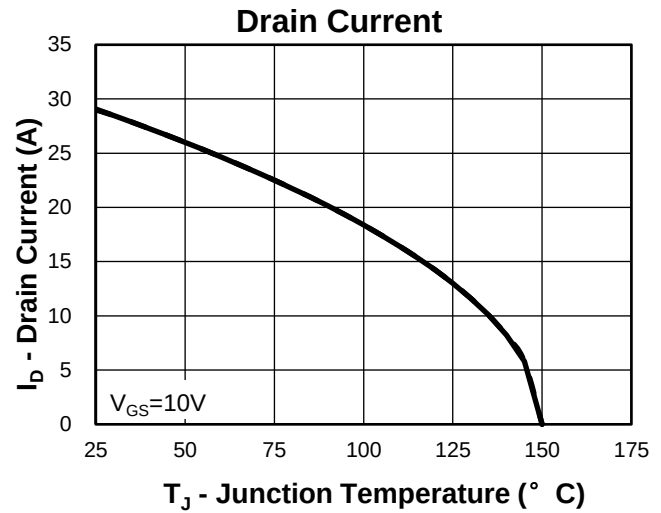
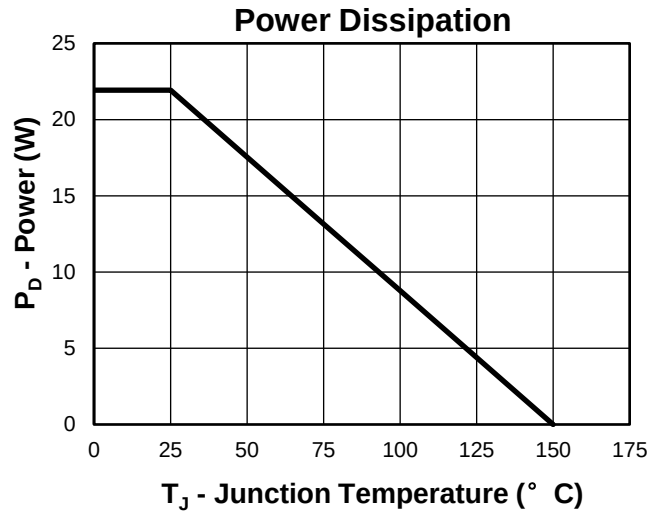
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS6416MAT	PDFN3333 DP1	Tape&Reel	5000	13"	12mm

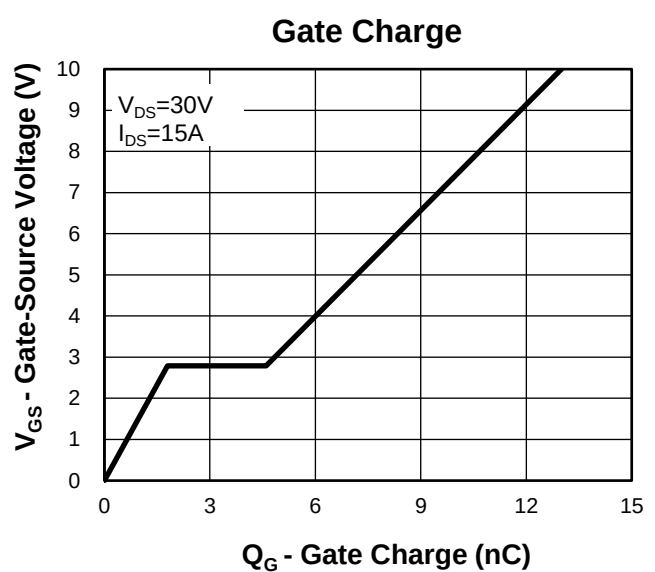
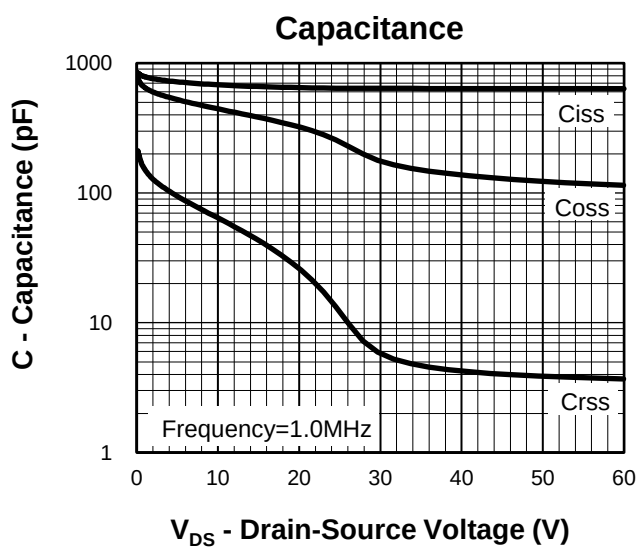
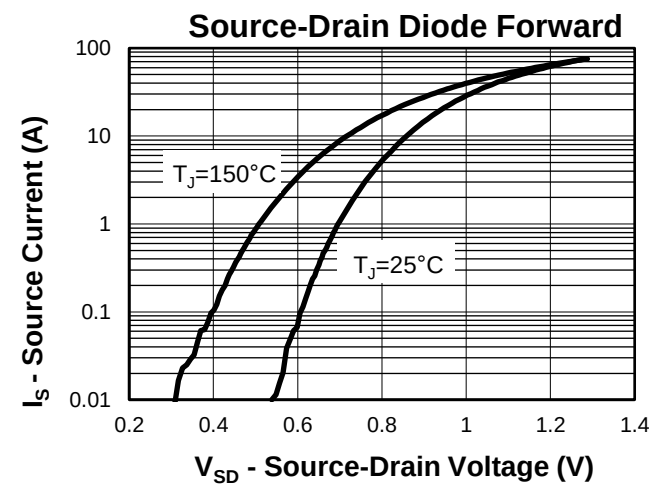
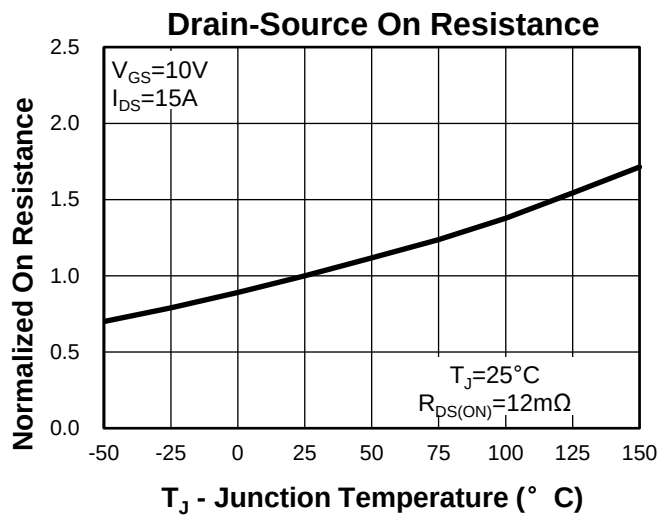
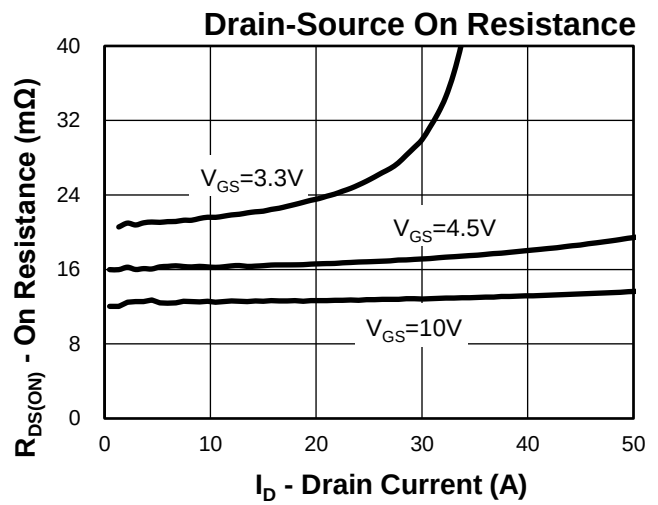
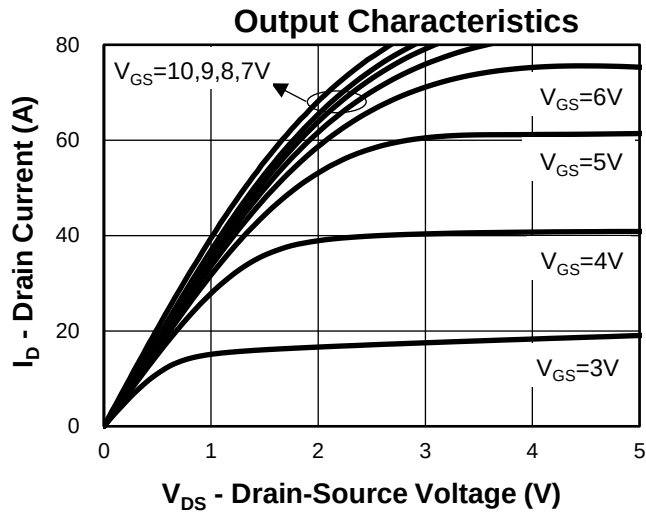


1st Line: Kwansemi Code(KS)
 2nd Line: Part Number(6416T)
 3rd Line: Lot Number(YWWXXX)

Typical Characteristics

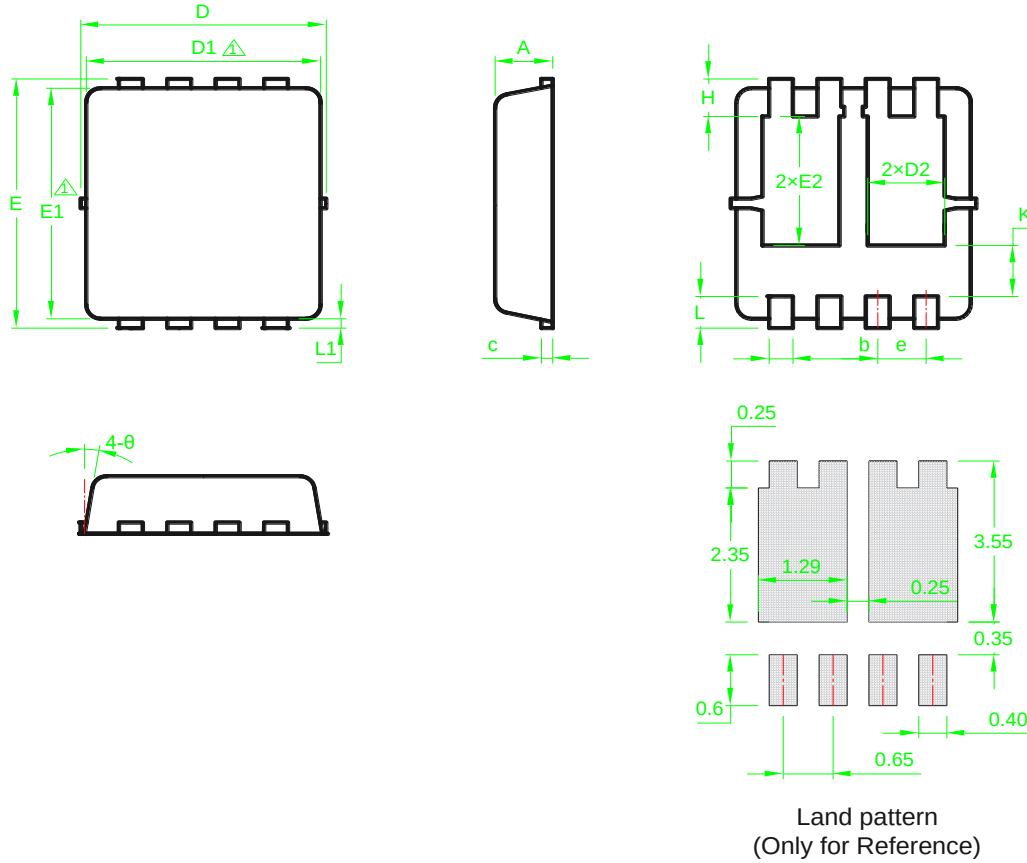


Typical Characteristics



Package Information

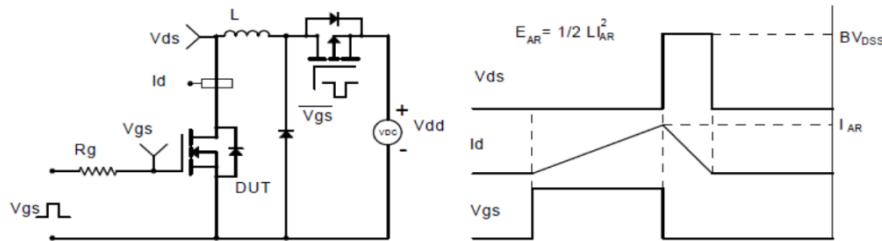
PDFN3333 DP1



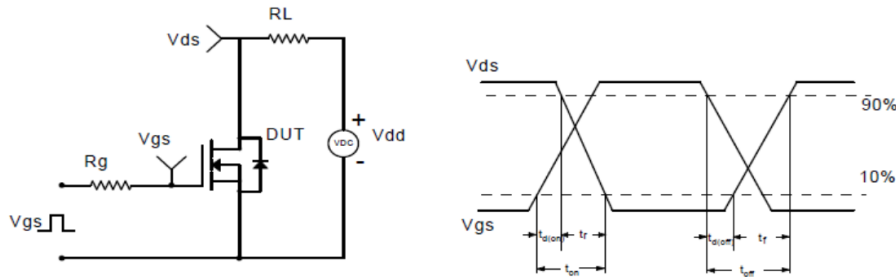
SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035	E2	1.65	*	1.95	0.065	*	0.077
b	0.25	0.30	0.35	0.010	0.012	0.014	e	0.65BSC			0.026BSC		
c	0.10	0.15	0.25	0.004	0.006	0.010	H	0.30	0.40	0.50	0.012	0.016	0.020
D	3.20	3.30	3.40	0.126	0.130	0.134	K	0.50	*	0.80	0.020	*	0.031
D1	3.00	3.15	3.25	0.118	0.124	0.128	L	0.30	0.40	0.50	0.012	0.016	0.020
D2	0.80	1.00	1.20	0.031	0.039	0.047	L1	0.10	0.15	0.20	0.004	0.006	0.008
E	3.20	3.30	3.40	0.126	0.130	0.134	θ	8°	*	12°	8°	*	12°
E1	2.90	3.05	3.20	0.114	0.120	0.126							

① Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

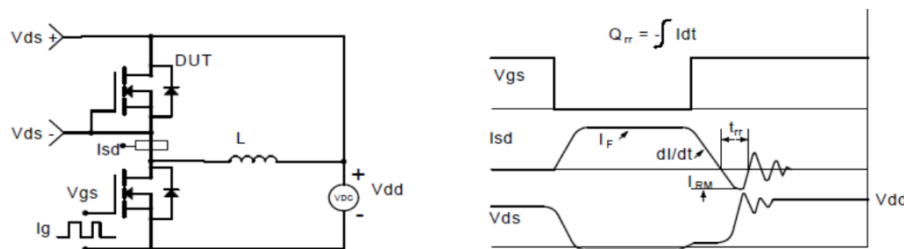
Avalanche Test Circuit and Waveforms



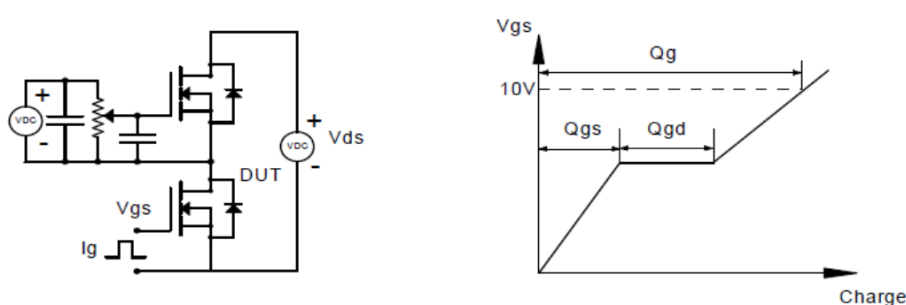
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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