

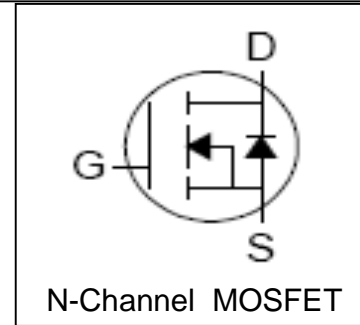
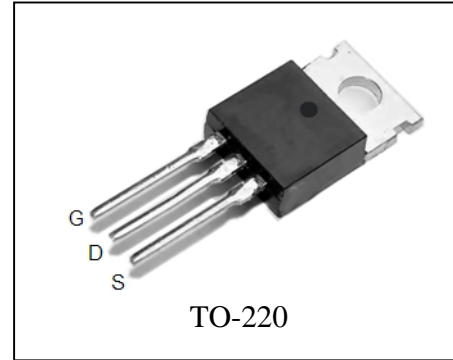
Features

- 100V/190A
 $R_{DS(ON)}=6.5m\Omega(Typ.) @ V_{GS}=10V$
- Avalanche Rated
- Reliable and Rugged
- Lead Free and Green Devices Available

Applications

- Automotive applications and a wide variety of other applications
- High Efficiency Synchronous in SMPS
- High Speed Power Switching

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings ($T_A=25^\circ C$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		100	V
V_{GSS}	Gate-Source Voltage		± 25	
T_J	Maximum Junction Temperature		175	$^\circ C$
T_{STG}	Storage Temperature Range		-55 to 175	$^\circ C$
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$	190 ^①	A
Mounted on Large Heat Sink				
I_{DP}	300 μs Pulsed Drain Current Tested	$T_C=25^\circ C$	700 ^②	A
I_D	Continue Drain Current($V_{GS}=10V$)	$T_C=25^\circ C$	190 ^①	
		$T_C=100^\circ C$	140 ^①	
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	312	W
		$T_C=100^\circ C$	156	
$R_{\theta JC}$	Thermal Resistance -Junction to Case		0.48	$^\circ C/W$
Drain-Source Avalanche Ratings				
E_{AS} ^③	Avalanche Energy ,Single Pulsed		625	mJ

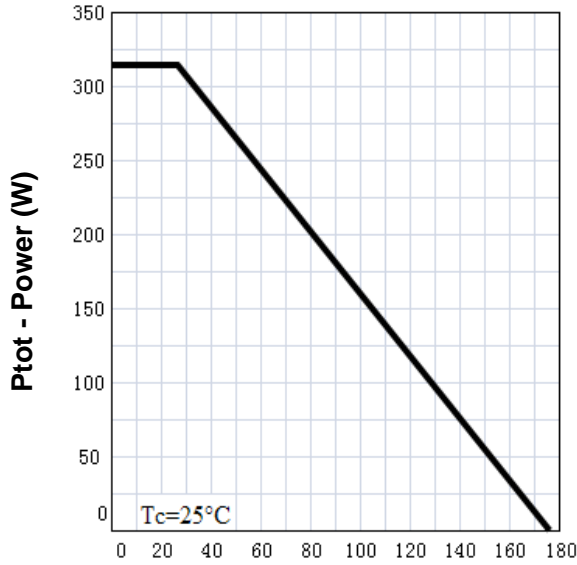
Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU190N10R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	100			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			1	μA
					30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2	3	4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(4)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=60A$		6.5	8.0	$m\Omega$
Diode Characteristics						
$V_{SD}^{(4)}$	Diode Forward Voltage	$I_{SD}=60A, V_{GS}=0V$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=60A, di_{SD}/dt=100A/\mu s$		68		ns
q_{rr}	Reverse Recovery Charge			130		nC
Dynamic Characteristics ⁽⁵⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		1.0		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=30V,$ Frequency=1.0MHz		6700		pF
C_{oss}	Output Capacitance			1000		
C_{rss}	Reverse Transfer Capacitance			510		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=35V, R_L=35\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$		23		ns
t_r	Turn-on Rise Time			42		
$t_{d(OFF)}$	Turn-off Delay Time			120		
t_f	Turn-off Fall Time			75		
Gate Charge Characteristics ⁽⁵⁾						
Q_g	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V,$ $I_{DS}=60A$		155		nC
Q_{gs}	Gate-Source Charge			45		
Q_{gd}	Gate-Drain Charge			48		

- Notes: ① Calculated continuous current based on maximum allowable junction temperature.
 ② Pulse width limited by safe operating area.
 ③ Limited by $T_{Jmax}, I_{AS}=50A, V_{DD}=48V, R_G=50\Omega$, Starting $T_J=25^\circ\text{C}$.
 ④ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 ⑤ Guaranteed by design, not subject to production testing.

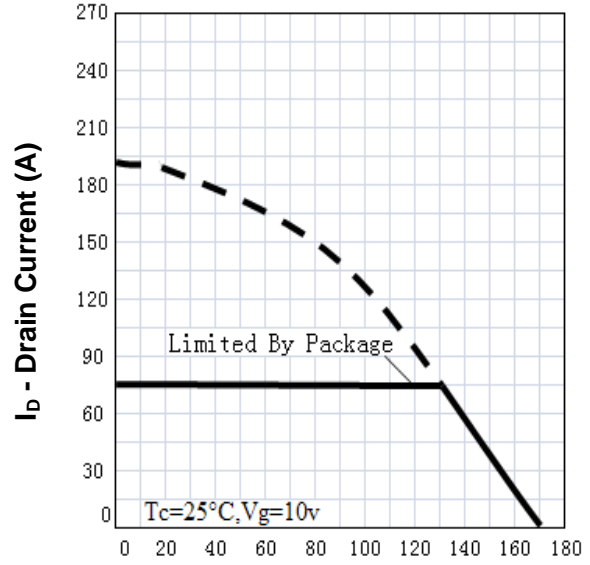
Typical Characteristics

Power Dissipation



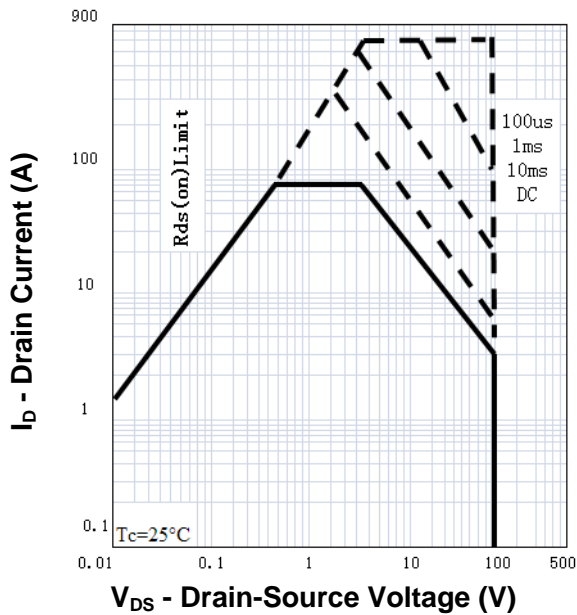
T_j - Junction Temperature (°C)

Drain Current

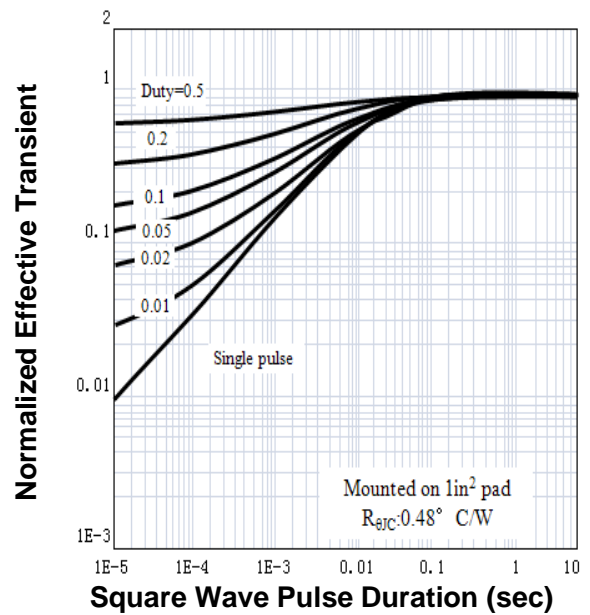


T_j - Junction Temperature (°C)

Safe Operation Area

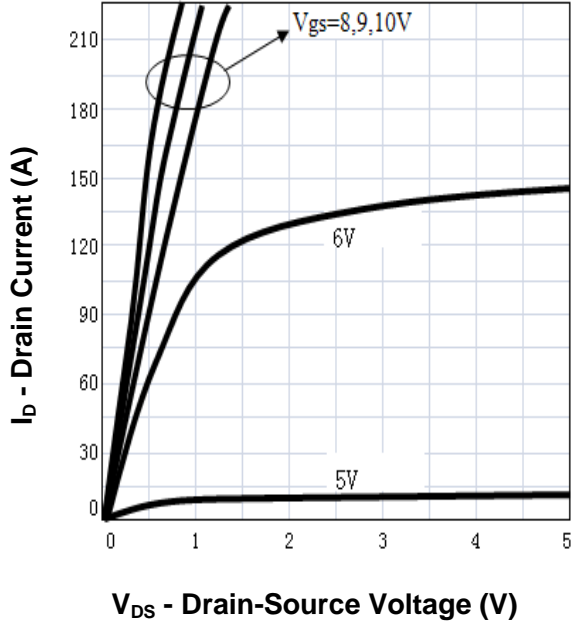


Thermal Transient Impedance

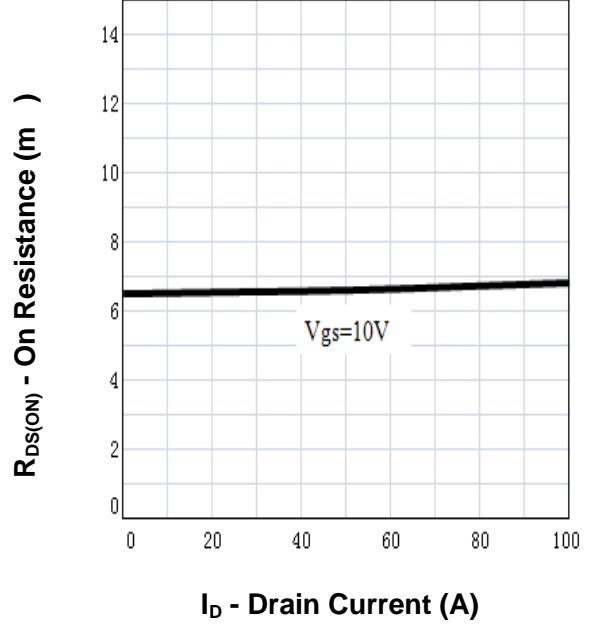


Typical Characteristics

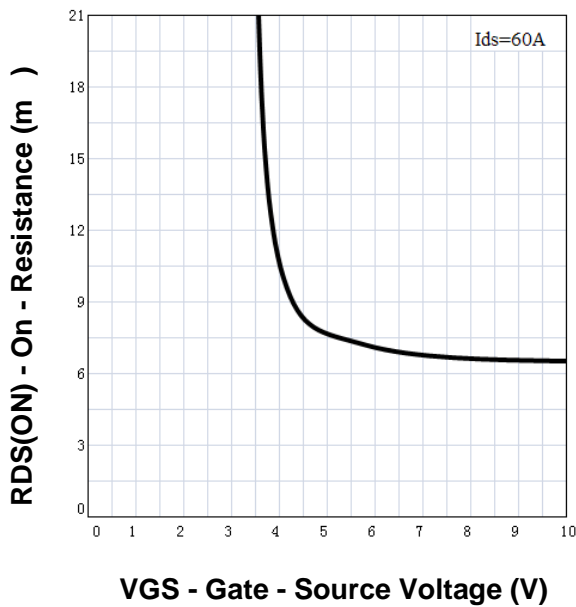
Output Characteristics



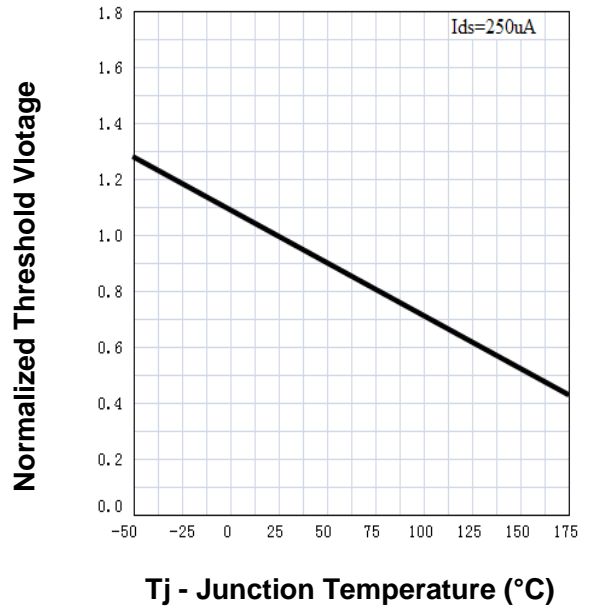
Drain-Source On Resistance



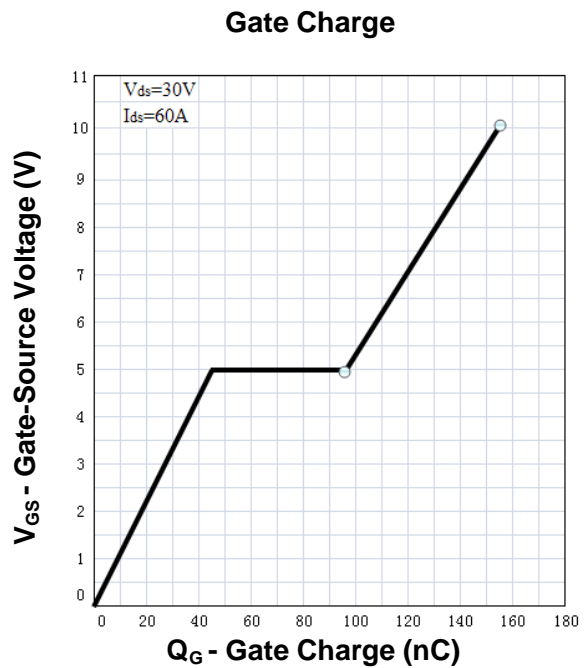
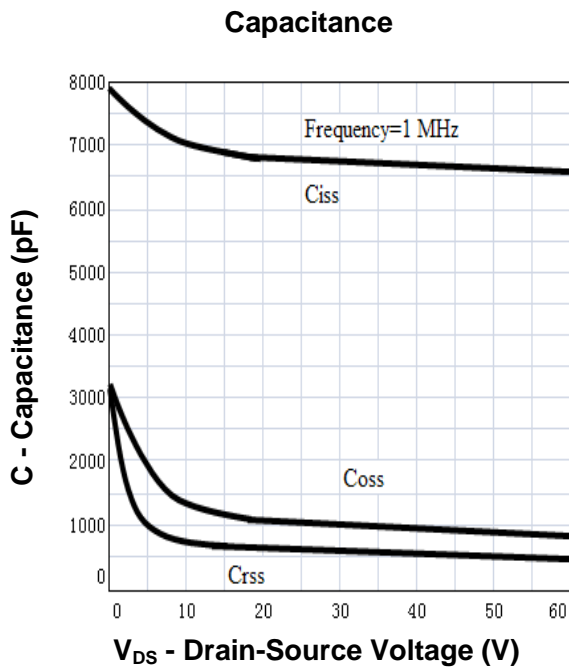
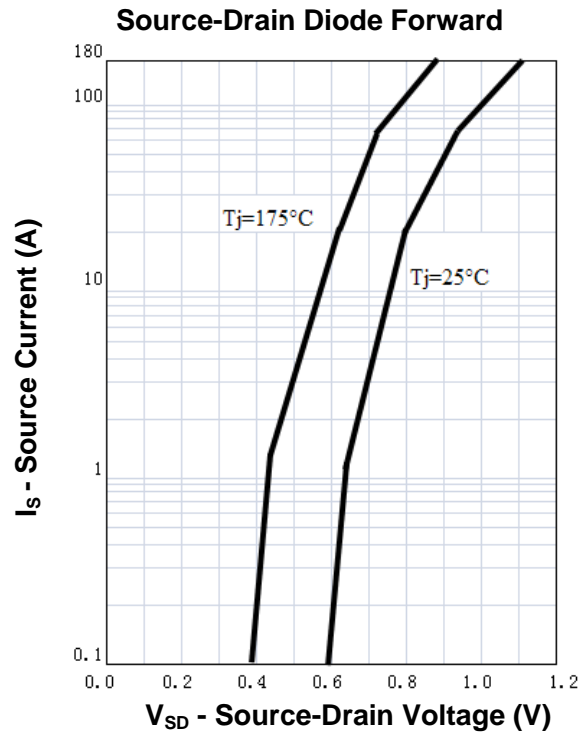
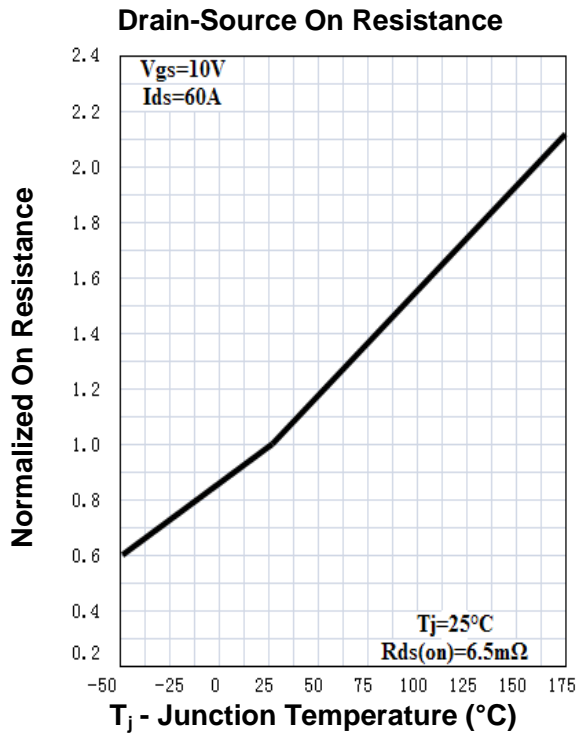
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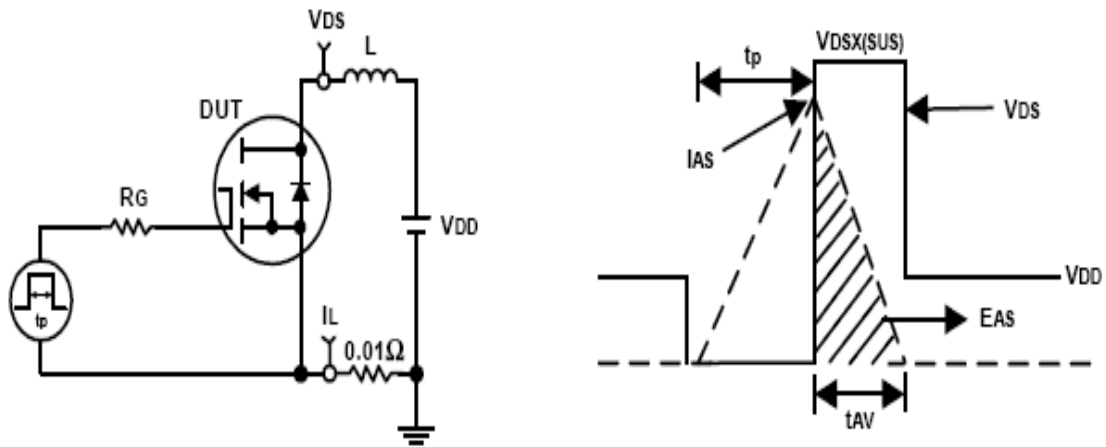
Gate Threshold Voltage



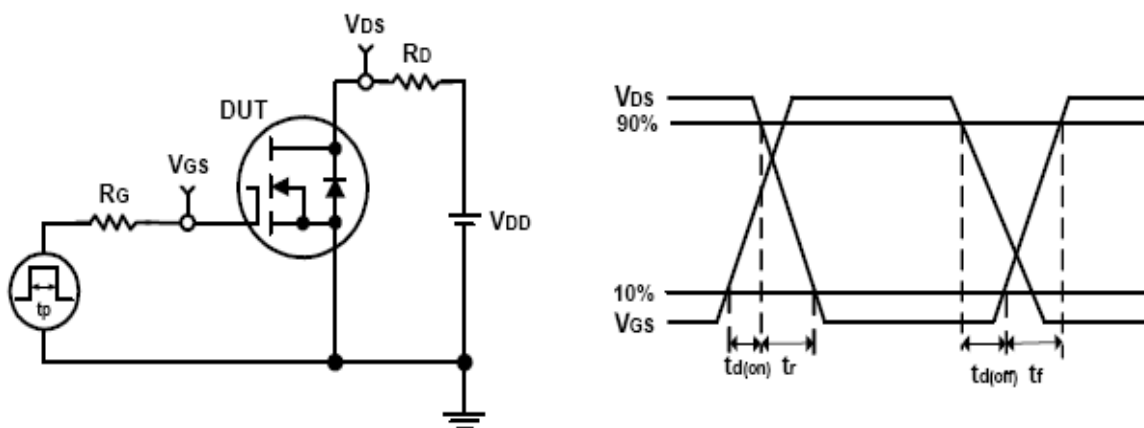
Typical Characteristics



Avalanche Test Circuit and Waveforms

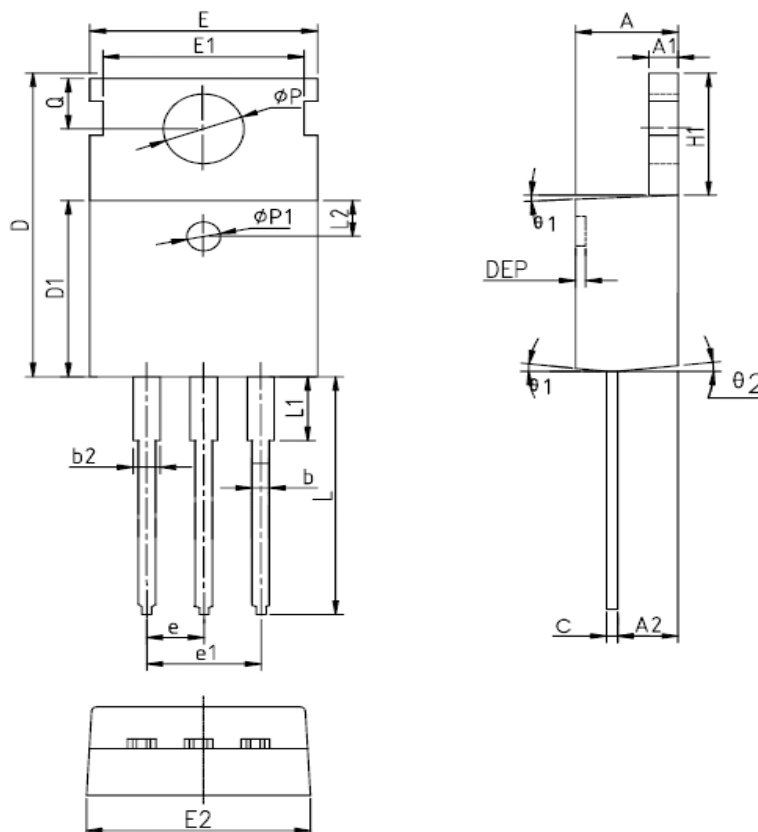


Switching Time Test Circuit and Waveforms



Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU190N10R	RU190N10R	TO-220	Tube	50	-	-

Package Information
TO-220FB-3L


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185	ϕ_{p1}	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.27	1.30	1.33	0.050	0.051	0.052	e	2.54BSC			0.1BSC		
A2	2.35	2.40	2.50	0.093	0.094	0.098	e1	5.08BSC			0.2BSC		
b	0.77	-	0.90	0.030	-	0.035	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.23	-	1.36	0.048	-	0.054	L	12.75	-	13.17	0.502	-	0.519
C	0.48	0.50	0.52	0.019	0.020	0.021	L1	-	-	3.95	-	-	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50REF.			0.098REF.		
D1	9.00	9.10	9.20	0.354	0.358	0.362	ϕ_p	3.57	3.60	3.63	0.141	0.142	0.143
DEP	0.05	0.10	0.20	0.002	0.004	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.70	9.90	10.10	0.382	0.389	0.398	θ_1	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	θ_2	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.401							

ALL DIMENSIONS REFER TO JEDEC STANDARD
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS

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