



N-Channel Enhancement Mode Field Effect Transistor

General Description

These are N-Channel enhancement mode silicon gate power field effect transistors. They are advanced power MOSFETs designed, this advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switch mode power supply, power factor correction, electronic lamp ballast based on half bridge.

Features

- 10.8A, 600V(See Note), $R_{DS(on)} < 0.75\Omega @ V_{GS} = 10V$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant

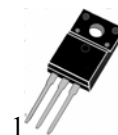
Maximum Ratings (Ta=25°C unless otherwise specified)

T _{stg}	Storage Temperature	-55~150°C
T _j	Operating Junction Temperature	150°C
V _{DSS}	Drain-Source Voltage	600V
V _{GSS}	Gate-Source Voltage	±30V
I _D	Drain Current (Continuous)(T _c =25°C)	10.8A
I _{DM}	Pulsed Drain Current (Note 1)	32.4A
P _D	Maximum Power Dissipation (T _c =25°C)	32.1W
	Derate Above 25°C	0.26W/°C
E _{AS}	Pulsed Avalanche Energy (Note 2)	201.7mJ
I _{AR}	Avalanche Current (Note 1)	3.7A
E _{AR}	Repetitive Avalanche Energy (Note 1)	0.94mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	20V/ns

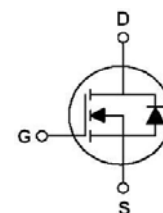
Thermal Characteristics

Symbol	Items	TO-220F	Unit
R _{thj-case}	Thermal Resistance Junction-case	Max 3.9	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max 62.5	°C/W

TO-220F



1- G 2-D 3-S



**Electrical Characteristics** (Ta=25°C unless otherwise specified)

Symbol	Items	Min.	Typ.	Max.	Unit	Conditions
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	600			V	I _D =250μA, V _{GS} =0V
I _{DSS}	Zero Gate Voltage Drain Current			1	μA	V _{DS} =600V, V _{GS} =0V
				10	μA	V _{DS} =480V, V _{GS} =0V, T _j =125°C
I _{GSS}	Gate – Body Leakage			±100	nA	V _{GS} = ±30V, V _{DS} =0V
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	2.0		4.0	V	V _{DS} = V _{GS} , I _D =250μA
R _{DS(on)}	Static Drain-Source On-Resistance			0.75	Ω	V _{GS} =10V, I _D =5A
Dynamic Characteristics and Switching Characteristics						
C _{iss}	Input Capacitance		1130	1505	pF	V _{DS} = 100 V, V _{GS} = 0V, f = 1.0 MHz
C _{oss}	Output Capacitance		45	60	pF	
C _{rss}	Reverse Transfer Capacitance		3	5	pF	
t _{d(on)}	Turn - On Delay Time		13.6	37.2	nS	V _{DS} = 380V, I _D =5.4A, R _G = 4.7 Ω (Note 4,5)
t _r	Rise Time		9.1	28.2	nS	
t _{d(off)}	Turn - Off Delay Time		42	94	nS	
t _f	Fall Time		10	30	nS	V _{DS} =380V, I _D =5.4A, V _{GS} = 10 V (Note 4,5)
Q _g	Total Gate Charge		27.4	35.6	nC	
Q _{gs}	Gate–Source Charge		4.9		nC	
Q _{gd}	Gate–Drain Charge		8.8		nC	
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Continuous Source–Drain Diode Forward Current			10.8	A	
I _{SM}	Pulsed Drain-Source Diode Forward Current			32.4	A	
V _{SD}	Source–Drain Diode Forward On–Voltage			1.2	V	I _S =5.4A, V _{GS} =0

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS}=3.7A, R_G=25 Ω, Starting T_J=25°C
3. I_{SD}≤10.8A, di/dt≤200A/μS, V_{DD}≤380V, Starting T_J=25°C
4. Pulse Test: Pulse width≤300μS, Duty Cycle≤2%
5. Essentially independent of operating temperature typical characteristics



Typical Characteristics

Figure 1. On-Region Characteristics

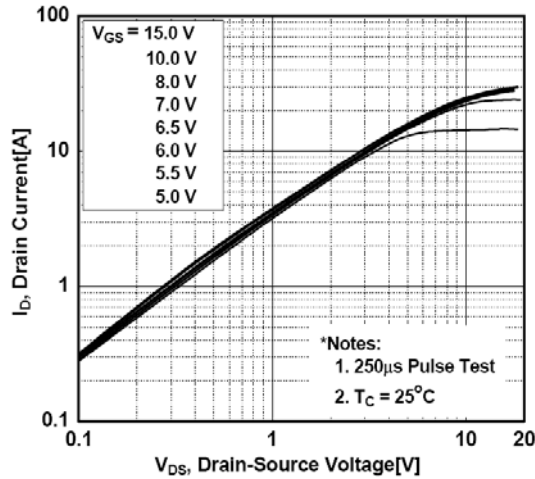


Figure 2. Transfer Characteristics

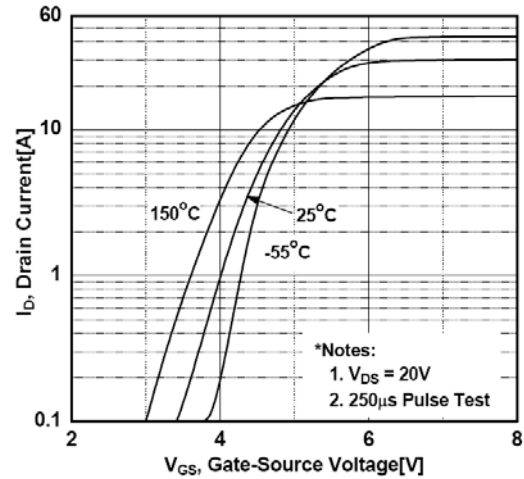


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

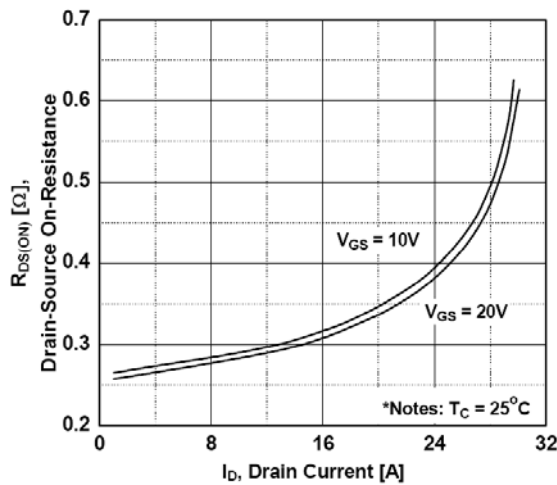


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

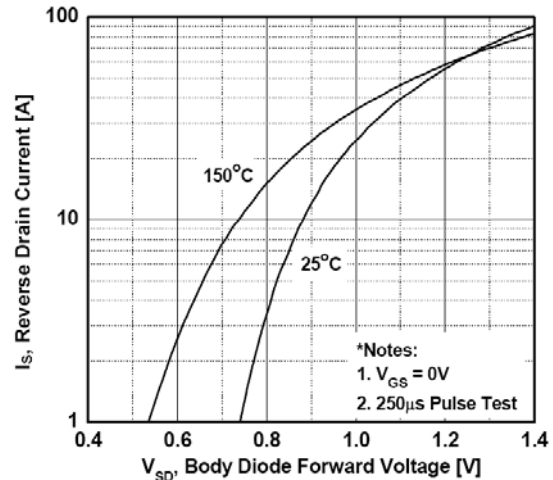


Figure 5. Capacitance Characteristics

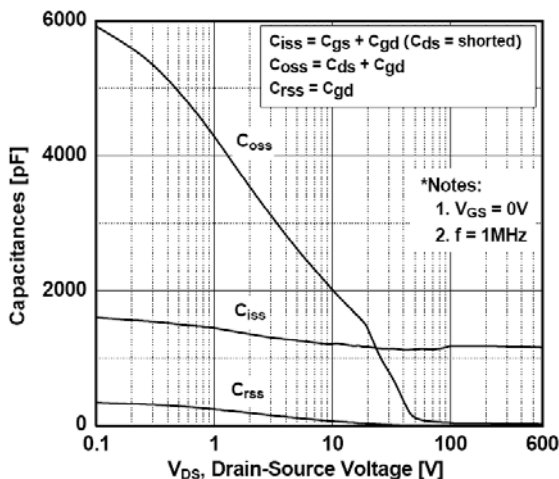
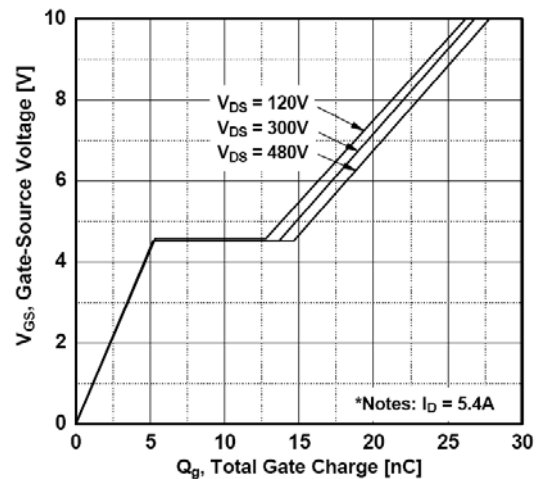


Figure 6. Gate Charge Characteristics





Typical Characteristics

Figure 7. Breakdown Voltage Variation vs. Temperature

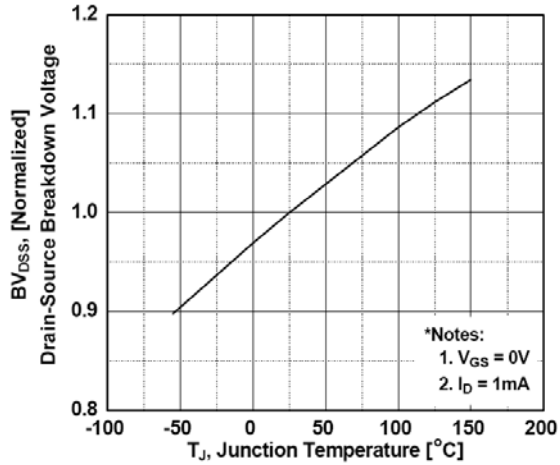


Figure 8. On-Resistance Variation vs. Temperature

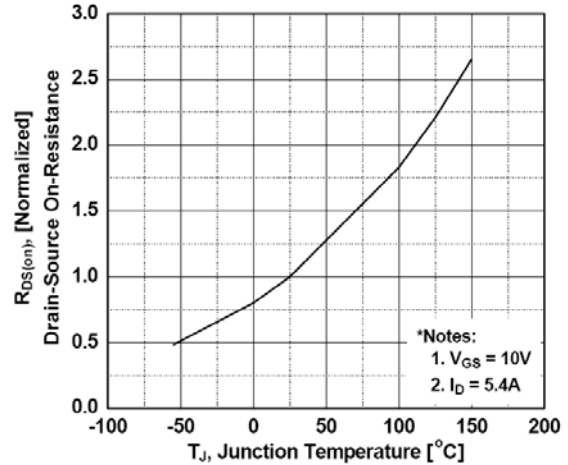


Figure 9. Maximum Safe Operating Area

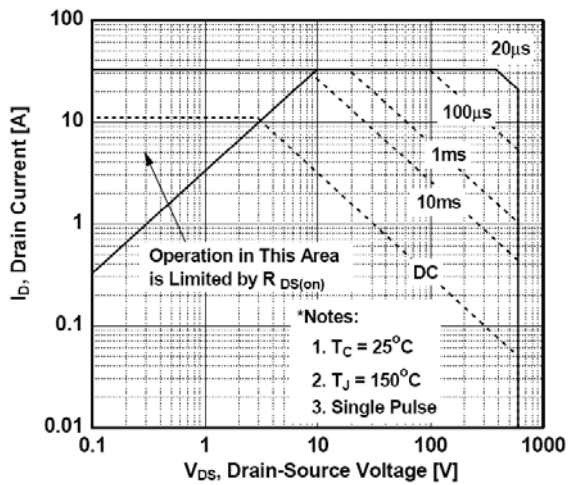


Figure 10. Maximum Drain Current vs. Case Temperature

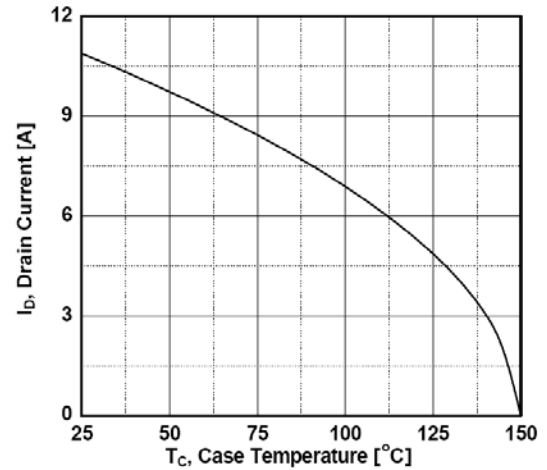
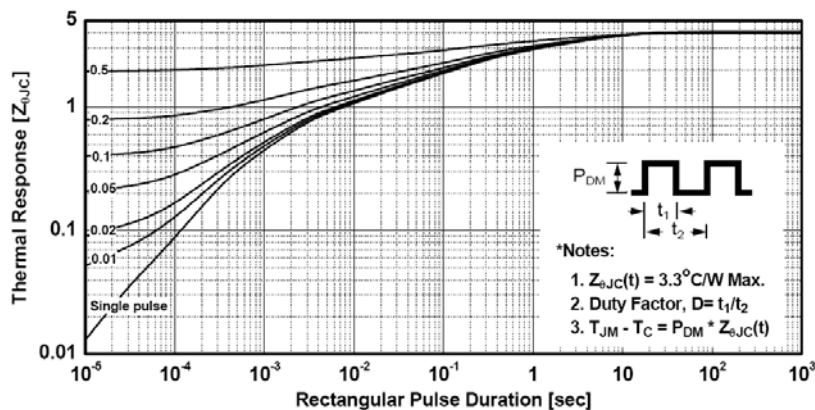


Figure 11. Transient Thermal Response Curve





■ Typical Characteristics

Fig 12. Gate Charge Test Circuit & Waveform

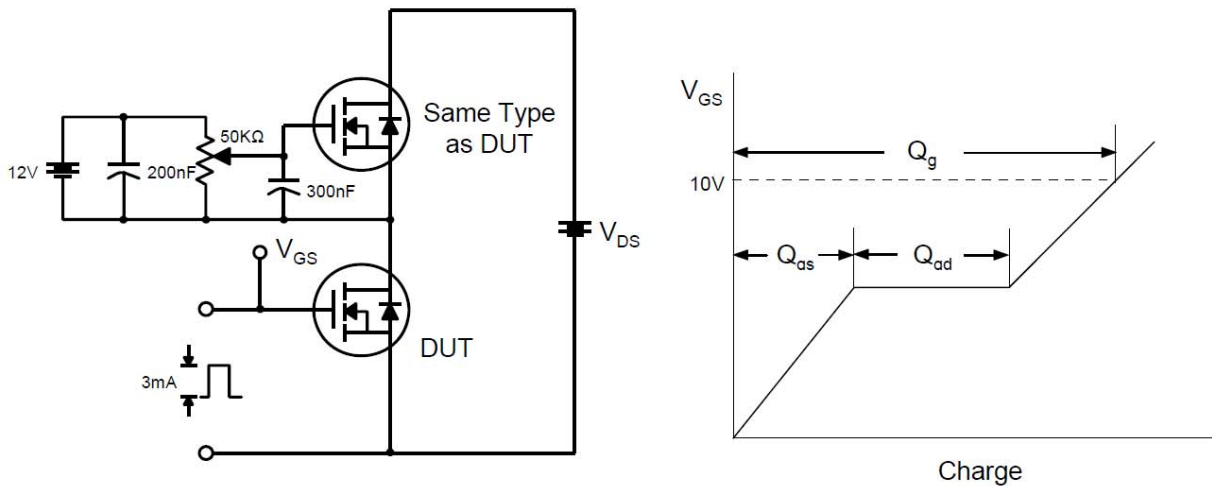


Fig 13. Resistive Switching Test Circuit & Waveforms

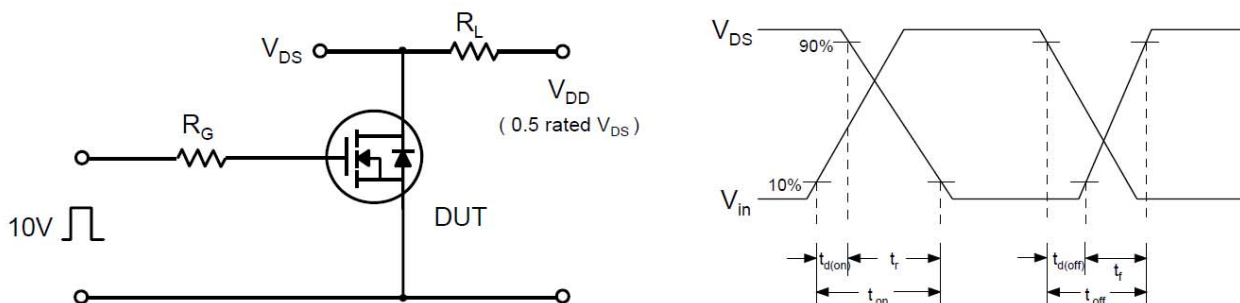
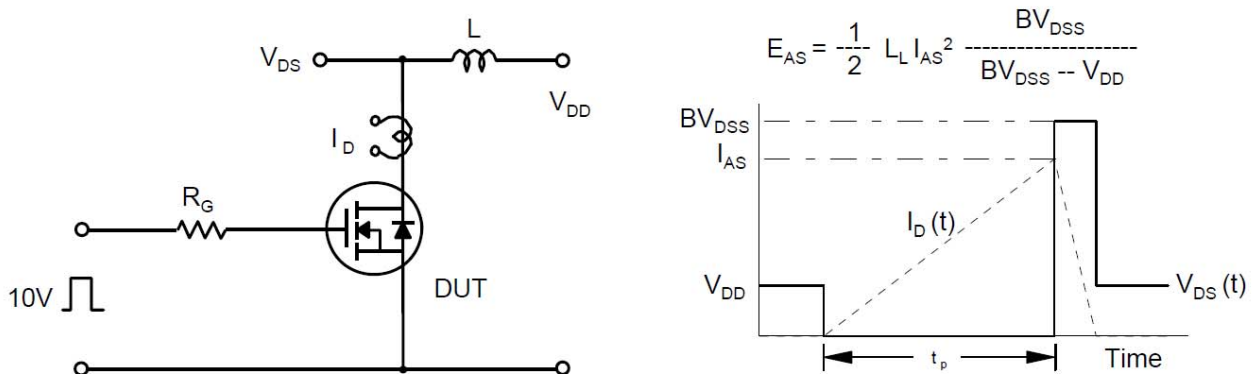


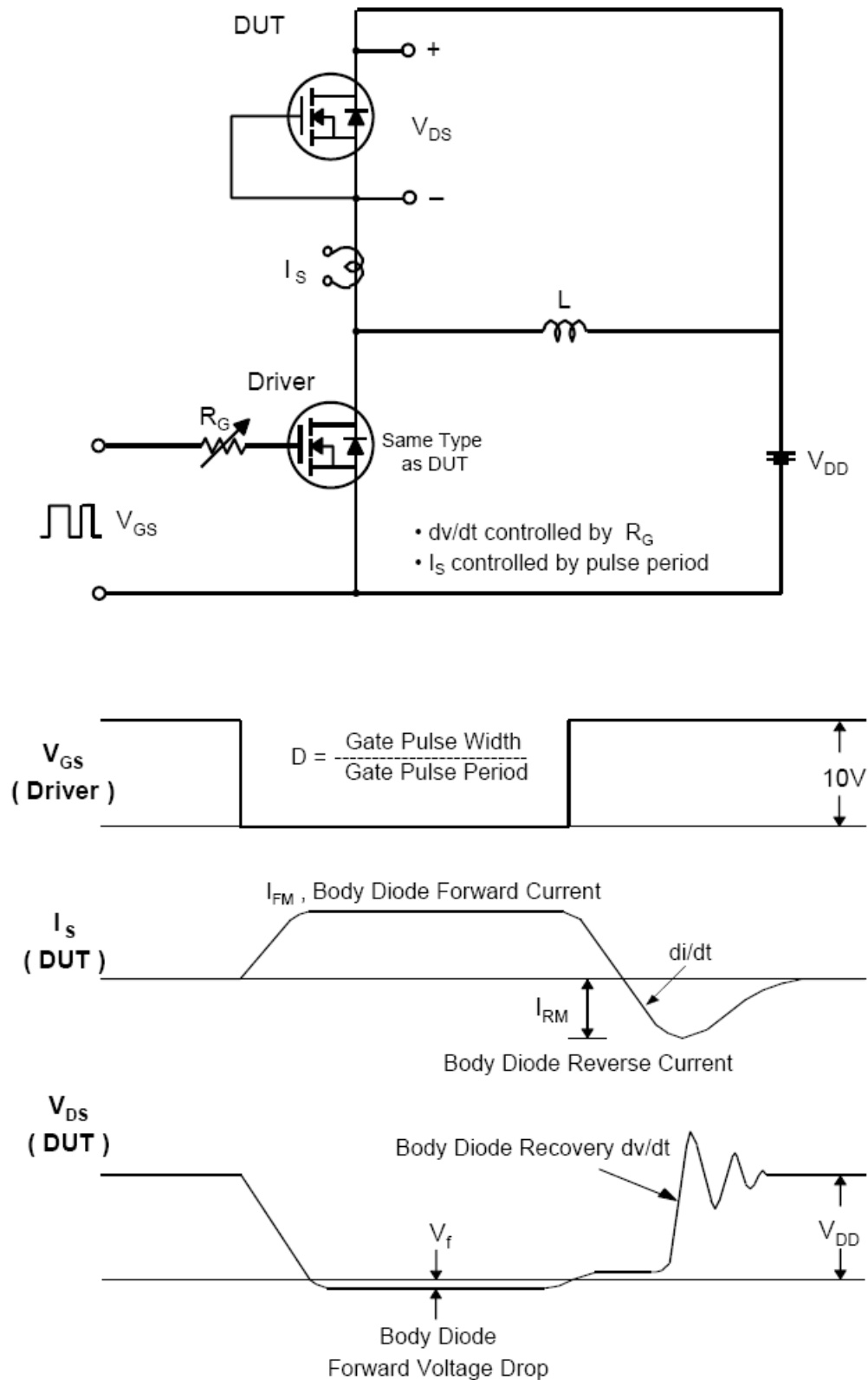
Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms





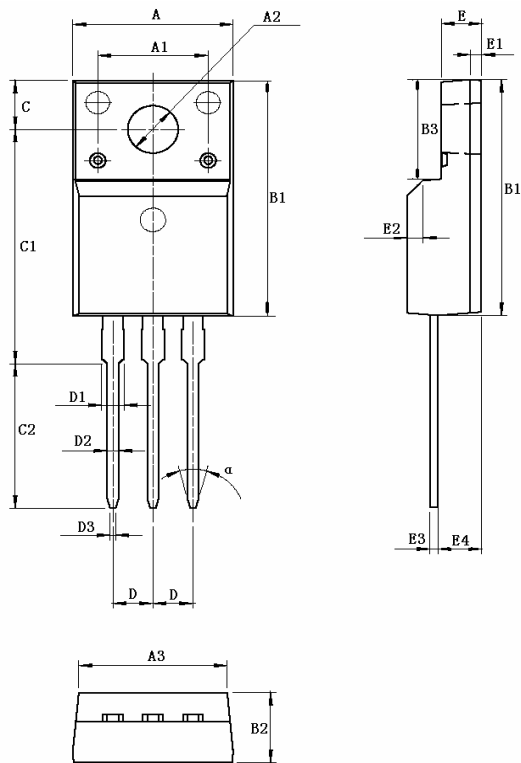
■ Typical Characteristics

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms





Package Dimensions



Symbol	Millimeters			Symbol	Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	9.96		10.36	D		2.54	
A1		7.0		D1			1.47
A2 (Φ)	3.08		3.28	D2	0.70		0.90
A3	9.26		9.66	D3	0.25		0.45
B1	15.67		16.07	E	2.34		2.74
B2	4.50		4.90	E1		0.70	
B3	6.48		6.88	E2		1.0×45°	
C	3.20		3.40	E3	0.45		0.60
C1	15.60		16.00	E4	2.56	2.76	2.96
C2	9.55		9.95	α(°)		30°	