

N-Channel Power MOSFET (63A, 55Volts)

DESCRIPTION

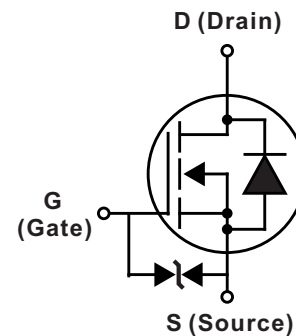
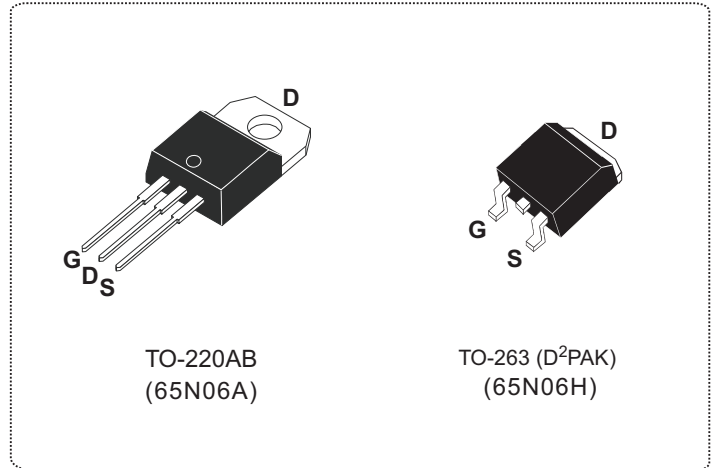
The Nell **65N06** is a three-terminal silicon device with current conduction capability of 63A, fast switching speed, low on-state resistance, breakdown voltage rating of 55V, and max. threshold voltage of 4 volts.

They are designed as an extremely efficient and reliable device and has integral zener giving diodes ESD protection up to 2KV. They are intended for use in DC to DC convertors and general purpose switching applications.

FEATURES

- $R_{DS(ON)} = 18m\Omega @ V_{GS} = 10V$
- Ultra low gate charge(40nC typical)
- Low reverse transfer capacitance ($C_{RSS} = 170pF$ typical)
- Fast switching capability
- 100% avalanche energy specified
- Improved dv/dt capability
- 175°C operation temperature

PRODUCT SUMMARY	
I_D (A)	63
V_{DSS} (V)	60
$R_{DS(ON)}$ (Ω)	0.018 @ $V_{GS} = 10V$
Q_G (nC) typ.	40



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ C$ unless otherwise specified)				
SYMBOL	PARAMETER	TEST CONDITIONS	VALUE	UNIT
V_{DSS}	Drain to Source voltag	$T_J = 25^\circ C$ to $150^\circ C$	55	V
V_{DGR}	Drain to Gate voltage	$R_{GS} = 20K\Omega$	55	
V_{GS}	Gate to Source voltage		± 20	
I_D	Continous Drain Current	$V_{GS} = 10V, T_C = 25^\circ C$	63	A
		$V_{GS} = 10V, T_C = 100^\circ C$	44	
I_{DM}	Pulsed Drain current(Note 1)		240	
dv/dt	Peak diode recovery dv/dt(Note 2)		7.0	V/ns
P_D	Total power dissipation	$T_C = 25^\circ C$	150	W
	Derating factor above $25^\circ C$		1.0	W/ $^\circ C$
V_C	Electro-static Discharge capacitor voltage, all pins	Human body model (100 pF, 1.5K Ω)	2	KV
T_J	Operation junction temperature		-55 to 175	$^\circ C$
T_{STG}	Storage temperature		-55 to 175	
T_L	Maximum soldering temperature, for 10 seconds	1.6mm from case	300	
	Mounting torque, #6-32 or M3 screw		10 (1.1)	lbf-in (N·m)

Note: 1.Repetitive rating; pulse width limited by junction temperature.
2. $I_{SD} \leq 50A, di/dt \leq 300A/\mu s, V_{DD} \leq V_{(BR)DSS}$, starting $T_J = 25^\circ C$.

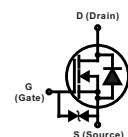
Nell High Power Products

THERMAL RESISTANCE					
SYMBOL	PARAMETER	Min.	Typ.	Max.	UNIT
$R_{th(j-c)}$	Thermal resistance, junction to case			1.05	
$R_{th(c-s)}$	Thermal resistance, case to heatsink		0.50		°C/W
$R_{th(j-a)}$	Thermal resistance, junction to ambient			62.5	

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

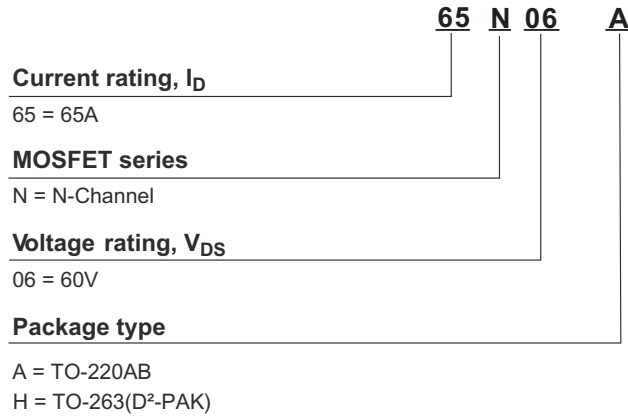
SYMBOL	PARAMETER	TEST CONDITIONS	Min.	Typ.	Max.	UNIT
$V_{(BR)DSS}$	Drain to source breakdown voltage	$V_{GS}=0V, I_D=250\mu A$	55			V
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown voltage temperature coefficient	$I_D = 250\mu A$, referenced to 25°C		0.07		V/°C
I_{DSS}	Drain to source leakage current	$V_{DS}=60V, V_{GS}=0V$	$T_C = 25^\circ\text{C}$		5	μA
			$T_C = 150^\circ\text{C}$		250	
I_{GSS}	Gate to source forward leakage current	$V_{GS} = -20V, V_{DS} = 0V$			100	nA
	Gate to source reverse leakage current	$V_{GS} = 20V, V_{DS} = 0V$			-100	
$R_{DS(ON)}$	Static drain to source on-state resistance	$V_{GS}=10V, I_D=25A$ (Note 1)		15	18	mΩ
$V_{GS(TH)}$	Gate threshold voltage	$V_{GS}=V_{DS}, I_D=1000\mu A$	2		4	V
g_{fs}	Forward transconductance	$V_{DS}=25V, I_D=25A$	6	30		
C_{ISS}	Input capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1\text{MHz}$		1500	2000	pF
C_{OSS}	Output capacitance			370	470	
C_{RSS}	Reverse transfer capacitance			170	250	
$t_{d(ON)}$	Turn-on delay time	$V_{DD} = 30V, I_D = 25A, R_G=10\Omega$ $V_{GS}=10V$ (Note 1)		15	25	ns
t_r	Rise time			30	60	
$t_{d(OFF)}$	Turn-off delay time			35	50	
t_f	Fall time			25	40	
L_D	Internal drain inductance	Between lead, 6mm form package and center of die		4.5		nH
L_S	Internal source inductance			7.5		
Q_G	Total gate charge	$V_{DS} = 44V, V_{GS} = 10V$ $I_D = 50A$		40		nC
Q_{GS}	Gate to source charge			10		
Q_{GD}	Gate to drain charge (Miller charge)			15		
W_{DSS}	Drain to source non-repetitivw unclamped inductive turn-off energy	$I_D = 50A, V_{DD}\leq 25V,$ $V_{GS}=10V, R_{GD}=50\Omega$			125	mJ

SOURCE TO DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

SYMBOL	PARAMETER	TEST CONDITIONS	Min.	Typ.	Max.	UNIT
V_{SD}	Diode forward voltage	$I_{SD} = 25A, V_{GS} = 0V$		0.95	1.20	V
		$I_{SD} = 50A, V_{GS} = 0V$		1.0	1.35	
$I_S(I_{SD})$	Continuous source to drain current	Integral reverse P-N junction diode in the MOSFET			63	A
I_{SM}	Pulsed source current				240	
t_{rr}	Reverse recovery time	$I_{SD} = 50A, V_{GS} = -10V,$ $V_R=30V, dI_F/dt = -100A/\mu s$		50		ns
Q_{rr}	Reverse recovery charge				0.1	μC
t_{ON}	Forward turn-on time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Note: 1. Pulse test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

ORDERING INFORMATION SCHEME



■ TEST CIRCUITS AND WAVEFORMS

Fig.1A Peak diode recovery dv/dt test circuit

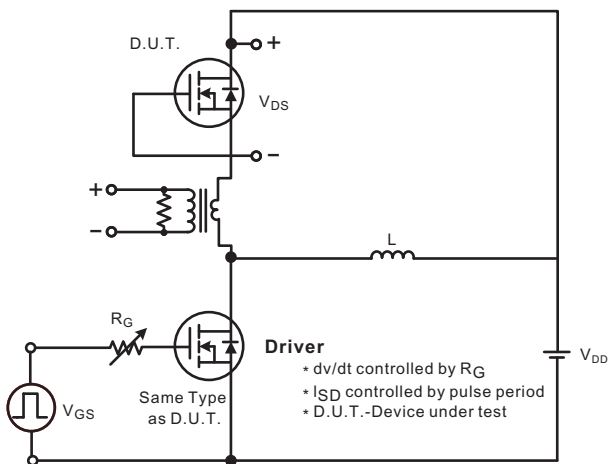


Fig.1B Peak diode recovery dv/dt waveforms

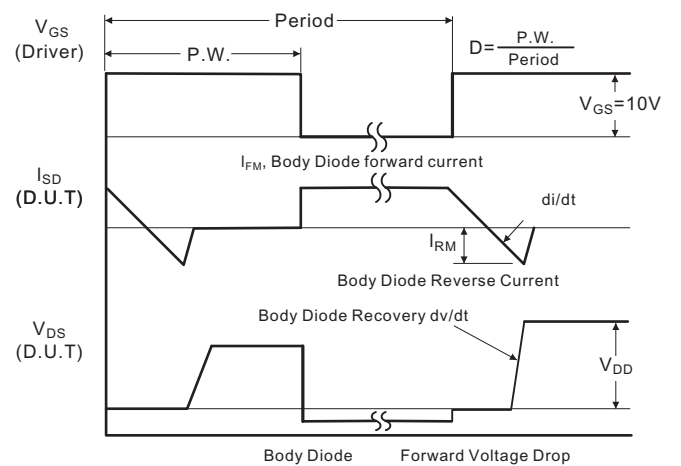


Fig.2A Switching test circuit

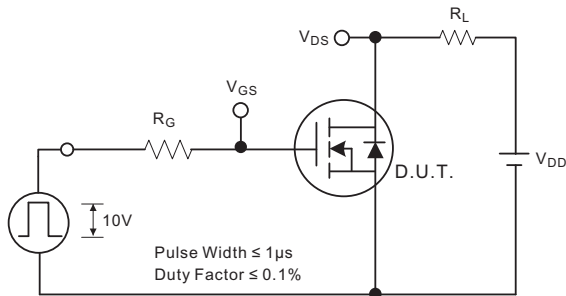


Fig.2B Switching Waveforms

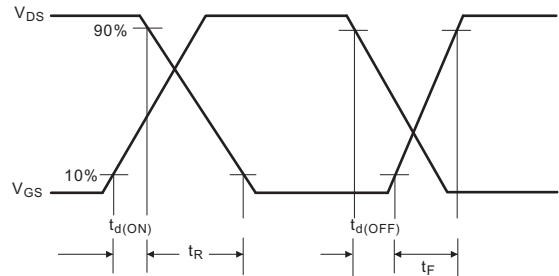


Fig.3A Gate charge test circuit

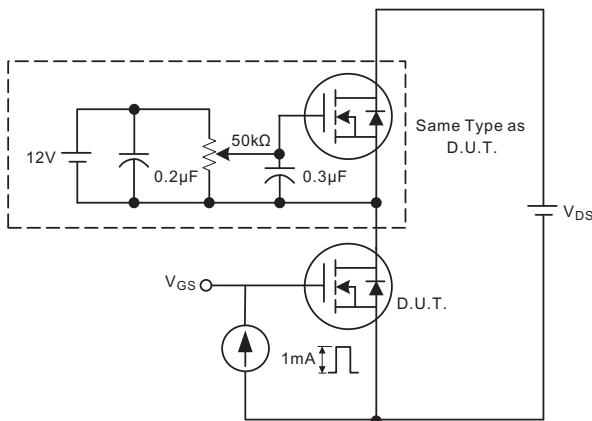
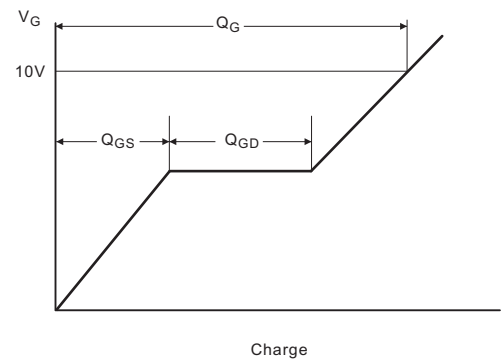


Fig.3B Gate charge waveform



■ TEST CIRCUITS AND WAVEFORMS (Cont.)

Fig.4A Unclamped Inductive switching test circuit

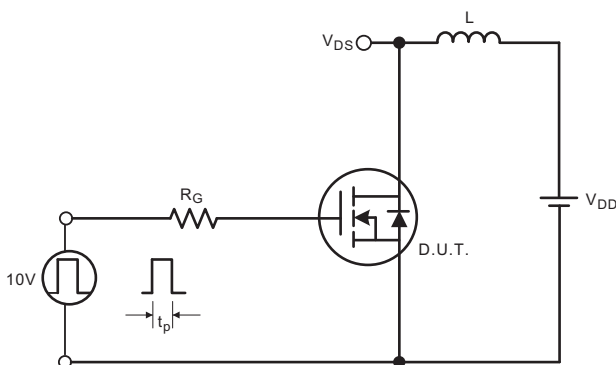
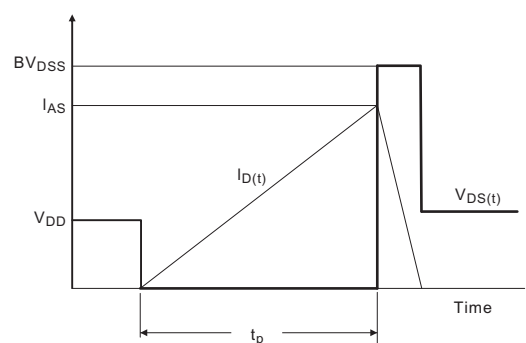


Fig.4B Unclamped Inductive switching waveforms



■ **TYPICAL CHARACTERISTICS**

Fig.1 Normalised power dissipation

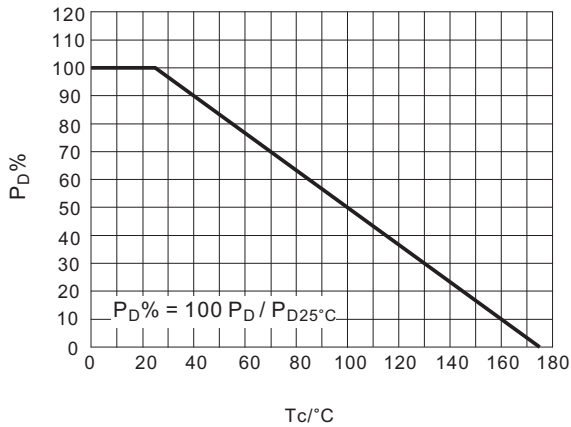


Fig.2 Transient thermal impedance

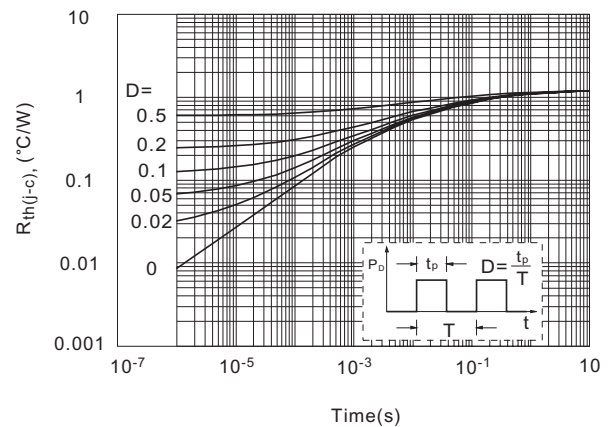


Fig.3 Normalised continuous drain current

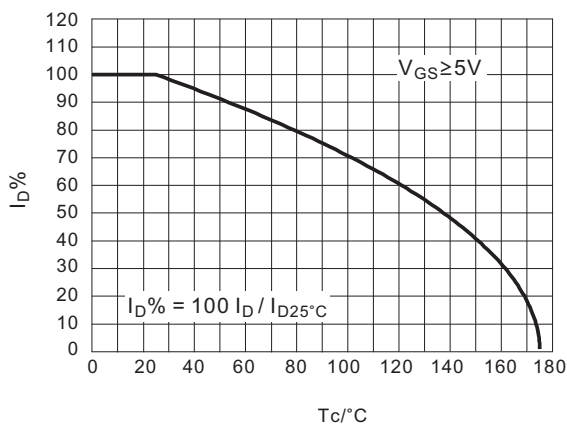


Fig.4 Typical output characteristics, T_j=25°C

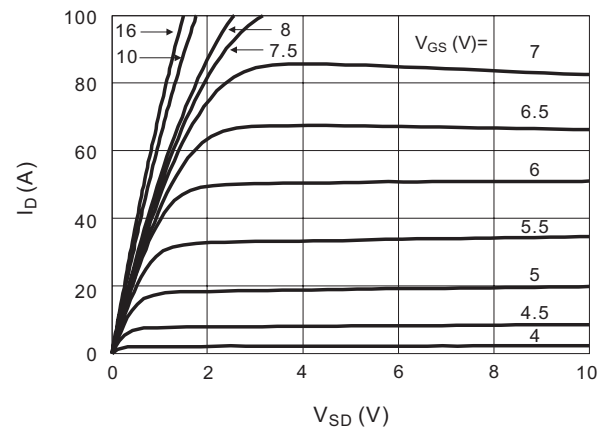


Fig.5 Safe operating area. T_{mb}=25°C

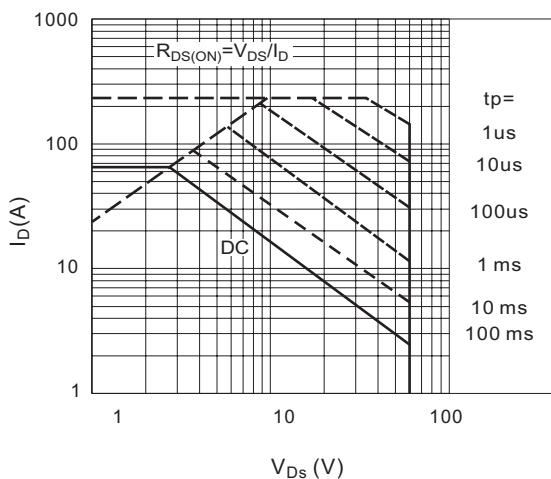


Fig.6 Typical on-state resistance, T_j=25°C

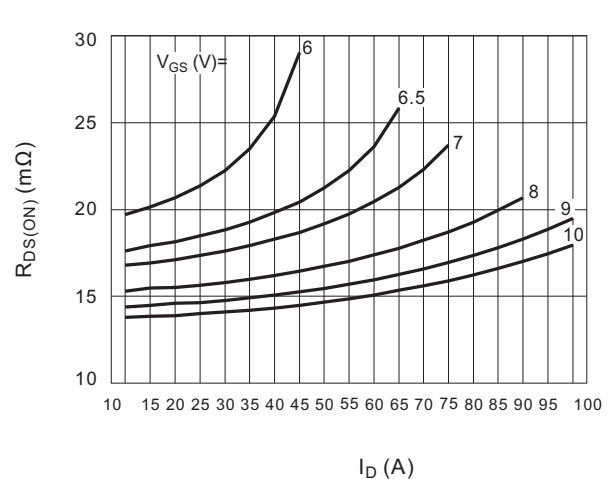


Fig.7 Typical transfer characteristics

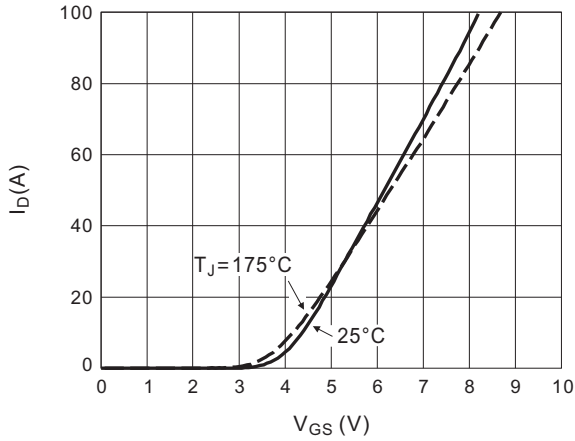


Fig.8 Gate threshold voltage

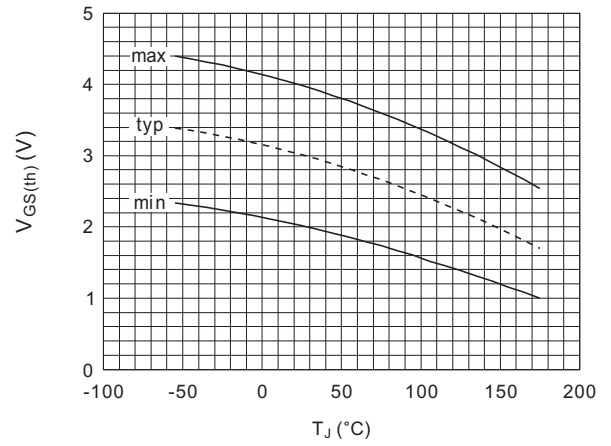


Fig.9 Typical transconductance, $T_J = 25^\circ\text{C}$

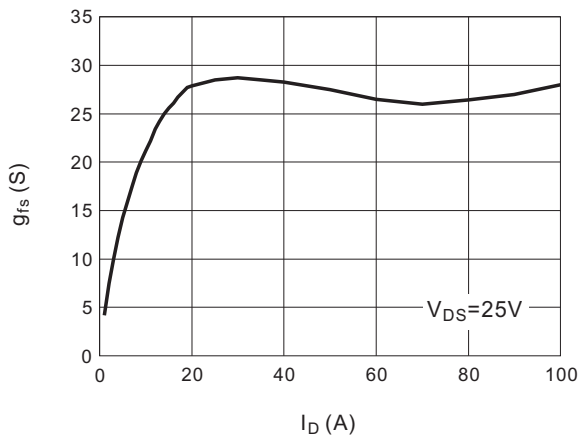


Fig.10 Sub-threshold drain current

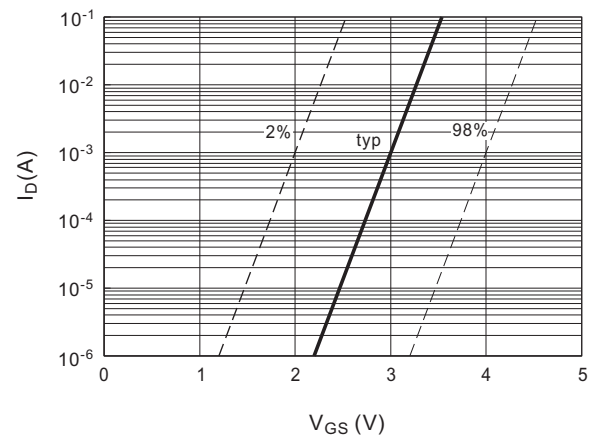


Fig.11 Normalized drain-source on-state resistance

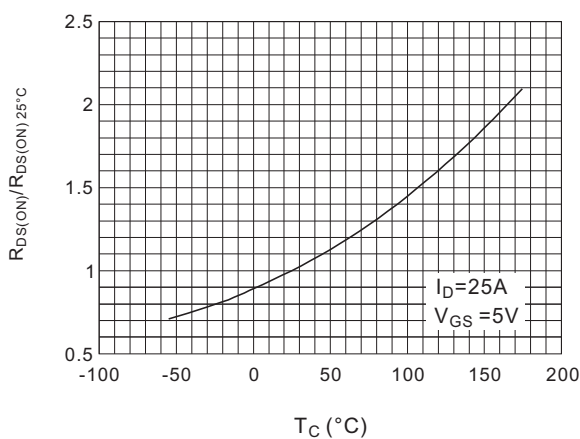


Fig.12 Typical capacitances, C_{iss} , C_{oss} , C_{rss}

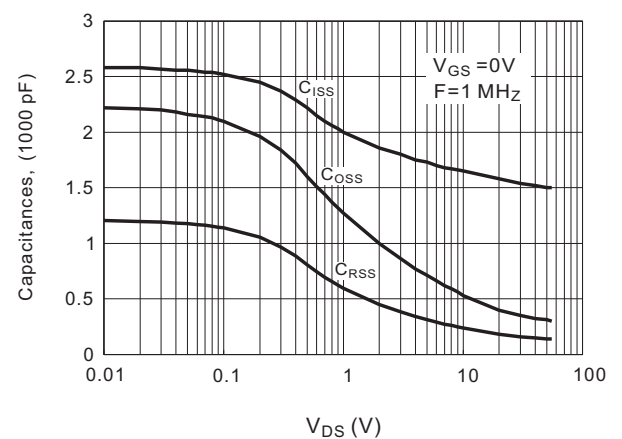


Fig. 13 Typical turn-on gate-charge characteristics

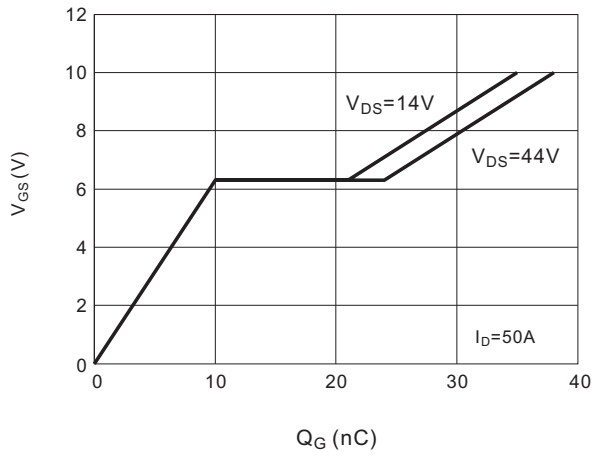


Fig. 14 Normalised avalanche energy rating

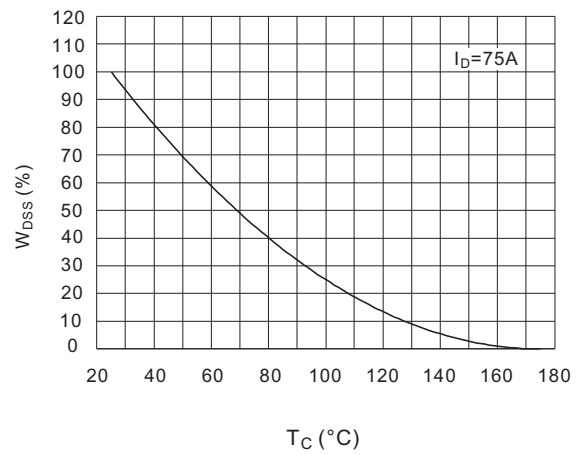


Fig. 15 Typical diode forward voltage

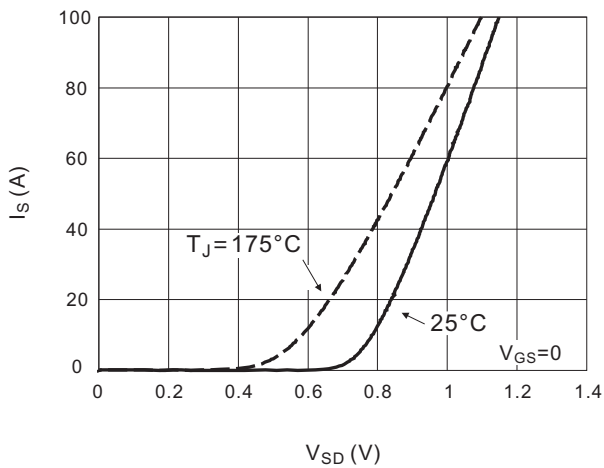
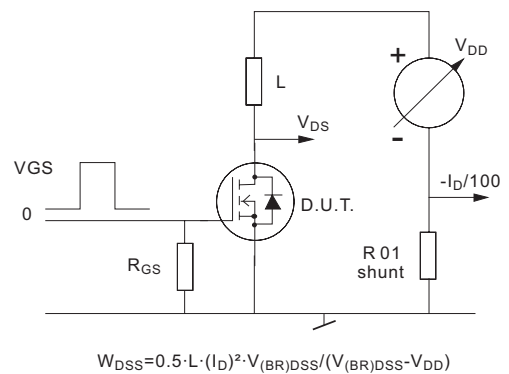
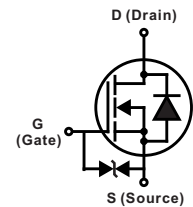
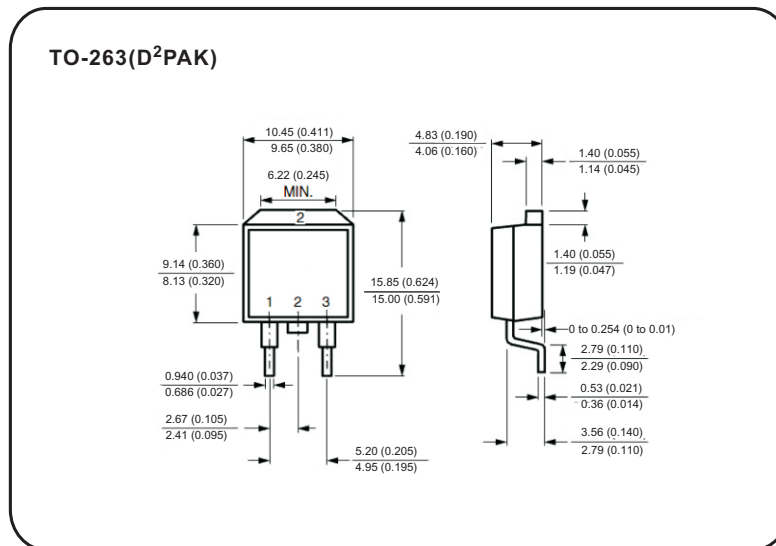
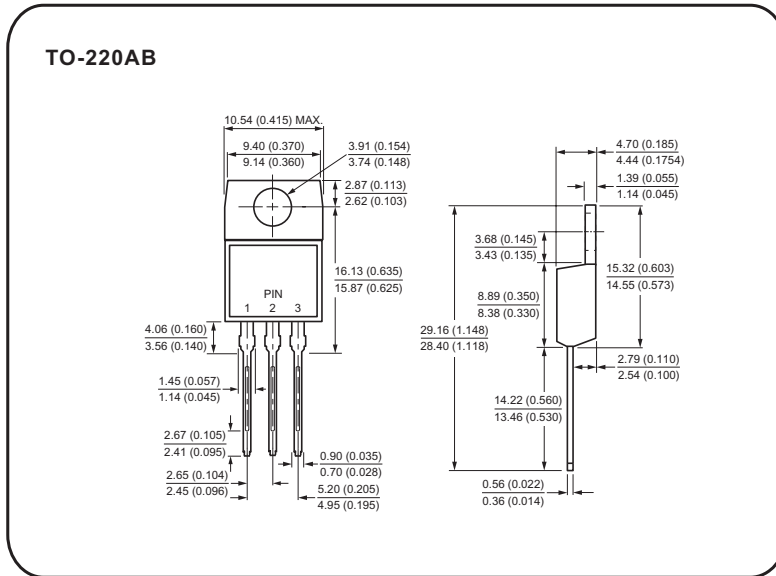


Fig. 16 Avalanche energy test circuit



Case Style



All dimensions in millimeters(inches)