

40V P-Channel Power MOSFET

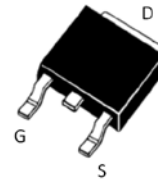
DESCRIPTION :

- Low on resistance
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔV_{ds} Tested
- Low gate charge
- RoHS compliant

V_{DSS}	-40V
$I_D (T_C=25^\circ C)$	-50A
$R_{DS(ON_Typ. @V_{GS}=-10V}$	12m Ω

TYPICAL APPLICATIONS :

- Power switching applications
- DC-DC converters
- Full bridge control



TO-252

MAXIMUM RATINGS (at $T_C = 25^\circ C$, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-40	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current	$T_C=25^\circ C$ $T_C=100^\circ C$	I_D	-50 -35	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	-155	A
Single Pulsed Avalanche Energy ⁽²⁾		E_{AS}	289	mJ
Avalanche Current ⁽²⁾		I_{AS}	-34	A
Power dissipation	$T_A=25^\circ C$ $T_C=25^\circ C$	P_{tot}	1.6 82	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	$^\circ C$

- Notes : 1. Repetitive rating, pulse width limited by maximum junction temperature.
2. $L=0.5mH, I_{AS}=-34A, V_{DD}=-32V, V_{GS}=-10V, Start T_J=25^\circ C..$

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Lead	$R_{\theta JA}$ $R_{\theta JL}$	78.1 1.52	$^\circ C/W$

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = -250uA	$V_{(BR)DSS}$	-40			V
Zero Gate Voltage Drain Current VDS = -40 V, VGS = 0 V	I_{DSS}			-1	uA
Gate-Source Leakage Current VGS = ± 20 V, VDS = 0V	I_{GSS}			± 100	nA
Gate-Source threshold voltage VDS = VGS, ID = -250uA	$V_{GS(th)}$	-1.1	-1.8	-2.5	V
Drain-Source On-State Resistance VGS = -10V, ID = -30A VGS = -4.5V, ID = -15A	$R_{DS(on)}$		12 20	15 25	m Ω
Gate Resistance VDD= 0 V, VGS= 0 V, f=1MHz	R_g		3.4		Ω
Input capacitance f=1MHz, VDS= -20 V, VGS=0 V	C_{iss}		2800		pF
Output capacitance f=1MHz, VDS= -20 V, VGS=0 V	C_{oss}		230		pF
Reverse transfer capacitance f=1MHz, VDS= -20 V, VGS=0 V	C_{rss}		180		pF
Total Gate Charge VDD= -20V, ID= -10A, VGS= -10V	Q_G		46		nC
Gate to Source Charge VDD= -20V, ID= -10A, VGS= -10V	Q_{GS}		12.2		nC
Gate to Drain Charge VDD= -20V, ID= -10A, VGS= -10V	Q_{GD}		6		nC
Turn-on delay time VDS= -20 V, VGS= -10V, ID= -10A, $R_D=3\Omega$	$t_{d(ON)}$		14		ns
Rise time VDS= -20 V, VGS= -10V, ID= -10A, $R_D=3\Omega$	t_r		53		ns
Turn-off delay time VDS= -20 V, VGS= -10V, ID= -10A, $R_D=3\Omega$	$t_{d(OFF)}$		45		ns
Fall time VDS= -20 V, VGS= -10V, ID= -10A, $R_D=3\Omega$	t_f		59		ns

Body Diode

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage ⁽³⁾ VGS = 0V, I _S = -10A	V _{SD}			-1.2	V
Maximum Continuous Body Diode Forward Current	I _S			-45	A
Revers Recovery Time IF = -10A, dIF/dt = 100A/us	T _{rr}		23		ns
Revers Recovery Charge IF = -10A, dIF/dt = 100A/us	Q _{rr}		11		nC

Notes : 3. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

Typical Performance Characteristics

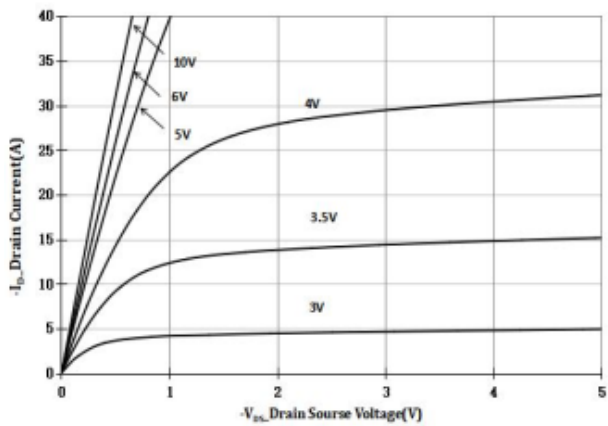


Figure 1 Output Characteristics

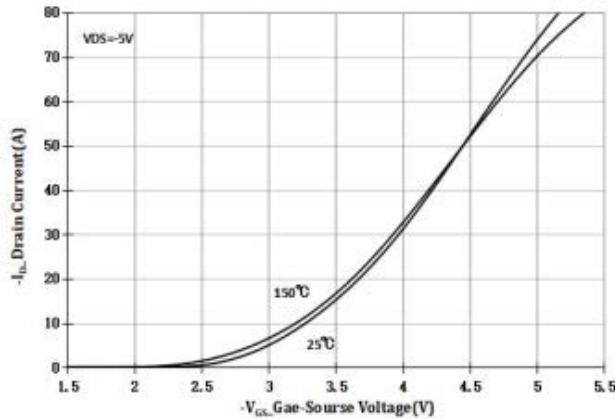


Figure 2. Transfer Characteristics

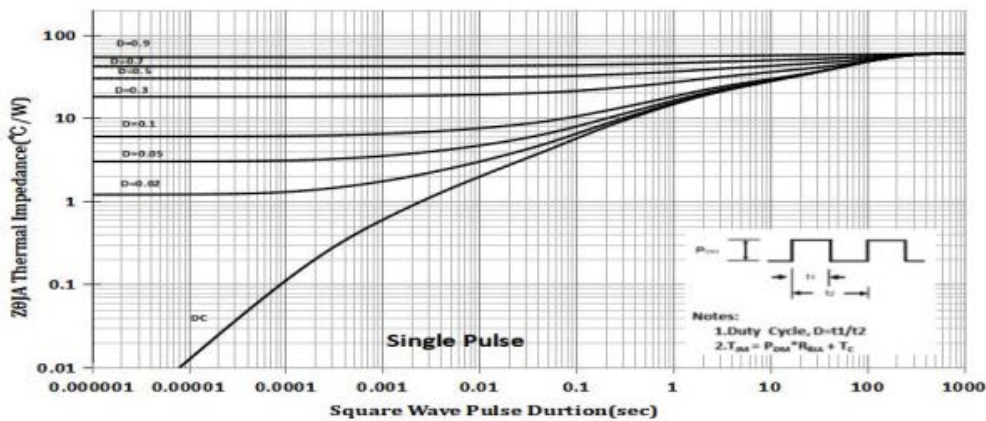


Figure 3. Normalized Maximum Transient Thermal Impedance

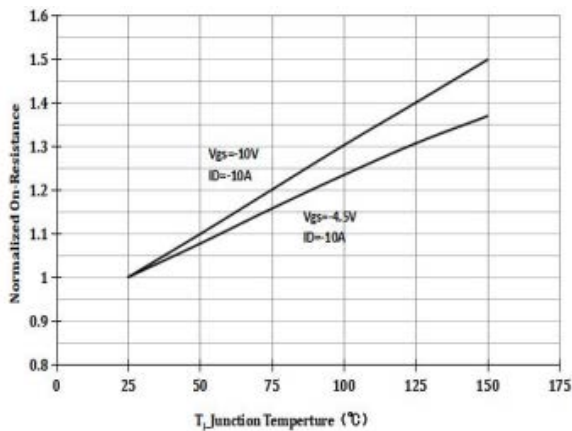


Figure 4. Rds(on) vs. Temperature

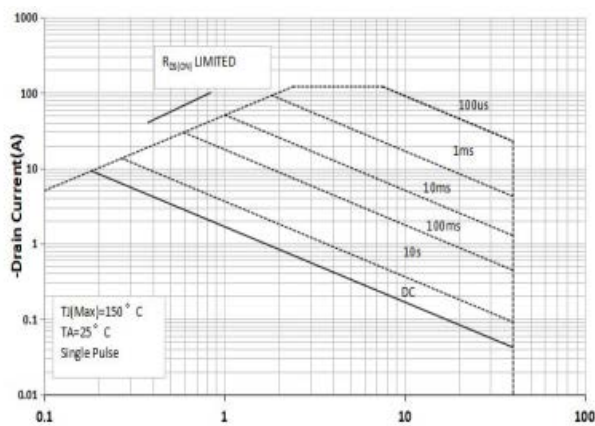


Figure 5. Safe Operating Area

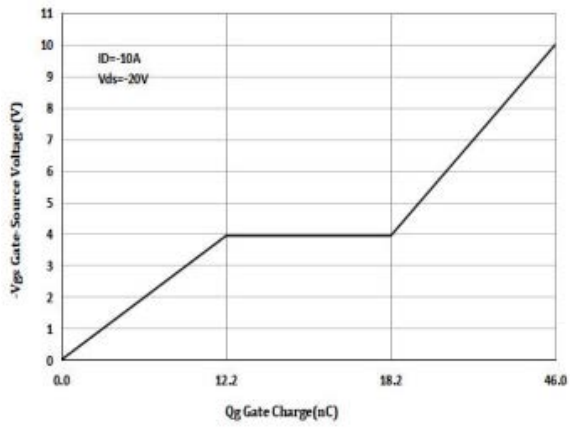


Figure 6. Gate Charge Characteristics

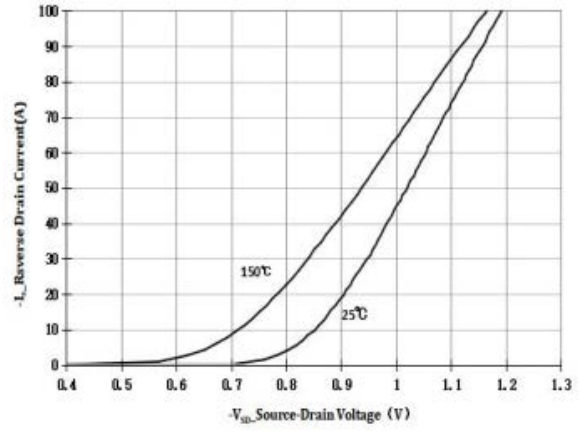


Figure 7. Body-diode Forward Characteristics

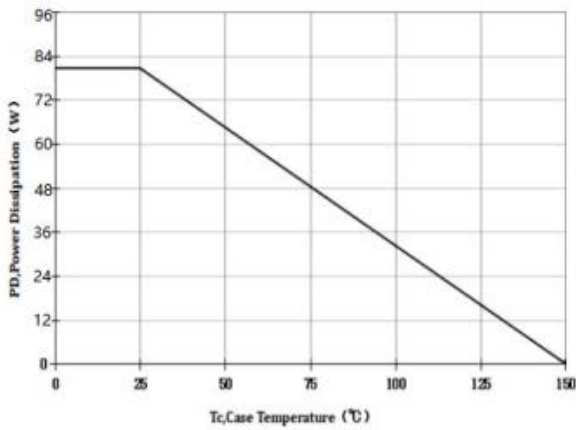


Figure 8. Power De-rating

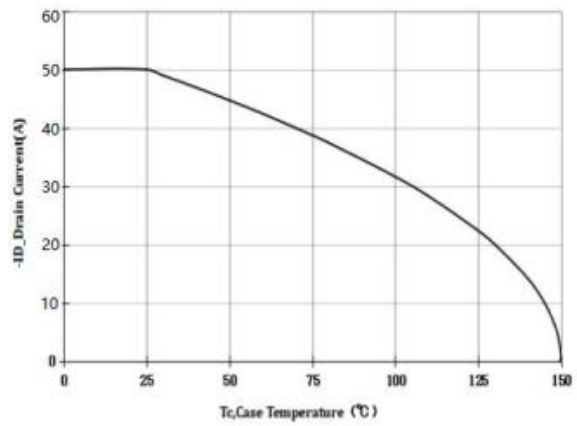


Figure 9. Current De-rating

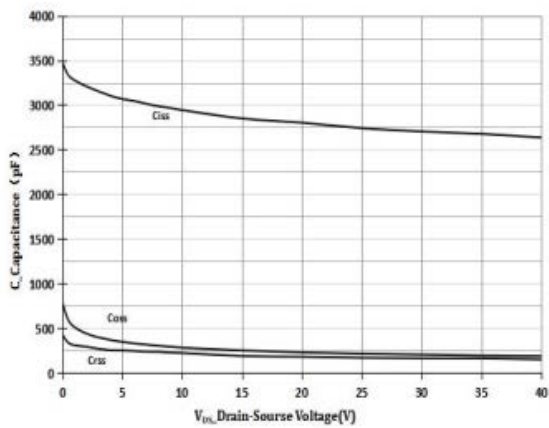
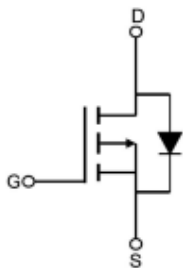
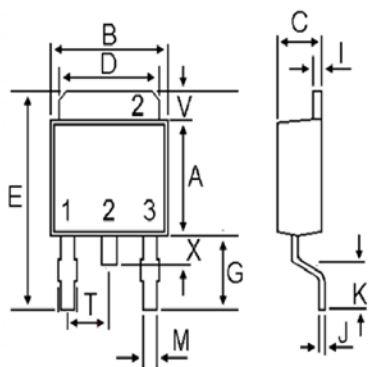


Figure 10. Capacitance vs Vds

- Circuit diagram



- Package outlines : Dimensions in (mm)



DIM	MILLIMETERS	
	MIN	MAX
A	5.97	6.22
B	6.30	6.75
C	2.18	2.40
D	4.95	5.50
E	9.40	10.41
G	2.75	3.20
I	0.46	0.89
J	0.46	0.61
K	1.40	1.78
M	0.64	0.89
T	2.18	2.38
V	0.89	1.27
X	---	1.05

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