UNIKC Semiconductor

RoHS Compliant

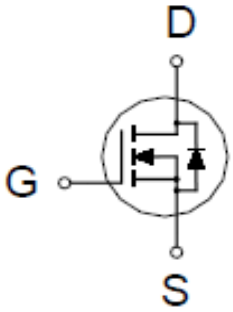
PT542BA

N-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
40V	4mΩ @V_{GS} = 10V	135A

TO-220



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current[2]	T_C= 25 °C	I_D	135	A
	T_C= 100 °C		85	
Pulsed Drain Current[1]		I_{DM}	200	
Avalanche Current		I_{AS}	68	
Avalanche Energy	L = 0.1 mH	E_{AS}	233	mJ
Power Dissipation	T_C= 25 °C	P_D	125	W
	T_C= 100°C		50	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		1	°C / W
Junction-to-Ambient	$R_{\theta JA}$		60	

[1]Pulse width limited by maximum junction temperature.

[2]Package limitation current is 120A.

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ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNITS
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.6	2.1	3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =32V, V_{GS} = 0V			1	μA
		V_{DS} =30V, V_{GS} = 0V, T_J = 125°C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 7V, I_D = 15A		4	6	mΩ
		V_{GS} = 10V, I_D = 20A		3.2	4	
Forward Transconductance[1]	g_{fs}	V_{DS} =5V, I_D = 20A		36		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz		3160		pF
Output Capacitance	C_{oss}			647		
Reverse Transfer Capacitance	C_{rss}			537		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		0.9		Ω
Total Gate Charge[2]	$Q_{g(VGS=10V)}$	V_{DS} =20V,I_D = 20A		91		nC
	$Q_{g(VGS=7V)}$			69		
Gate-Source Charge[2]	Q_{gs}			15		
Gate-Drain Charge[2]	Q_{gd}			44		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 20V $I_D \cong$ 20A, V_{GS}= 10V, R_{GEN} =6Ω		40		nS
Rise Time[2]	t_r			95		
Turn-Off Delay Time[2]	$t_{d(off)}$			129		
Fall Time[2]	t_f			92		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				135	A
Forward Voltage[1]	V_{SD}	I_F = 20A, V_{GS} = 0V			1.5	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,dI_S/dt = 100A / μS		41		nS
Reverse Recovery Charge	Q_{rr}			36		nC

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

[3]Package limitation current is 120A.

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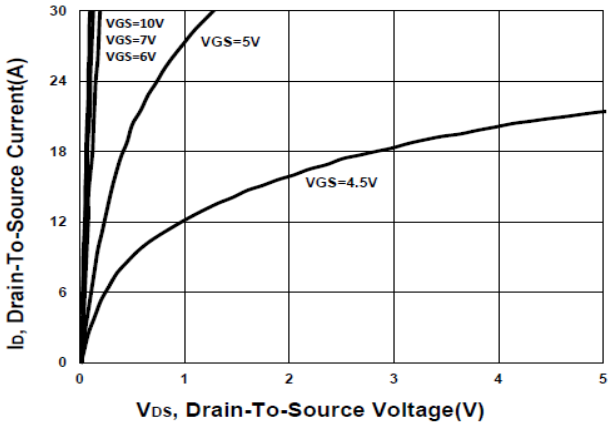
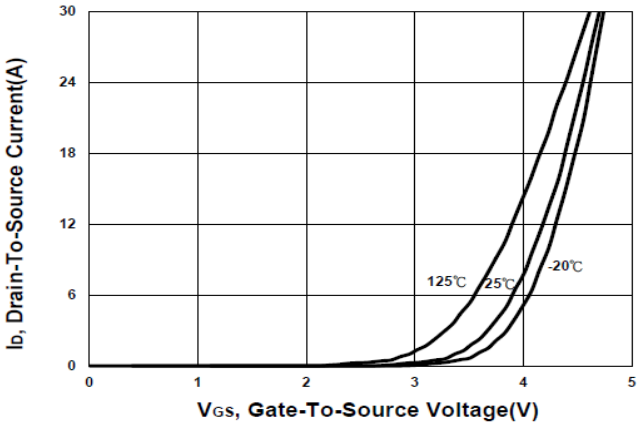
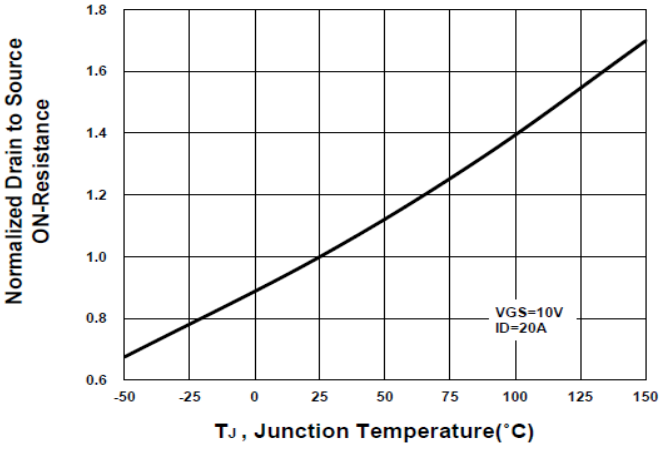
Output Characteristics



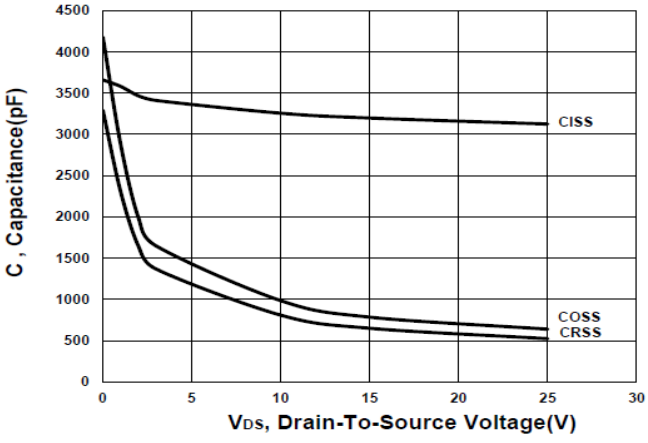
Transfer Characteristics



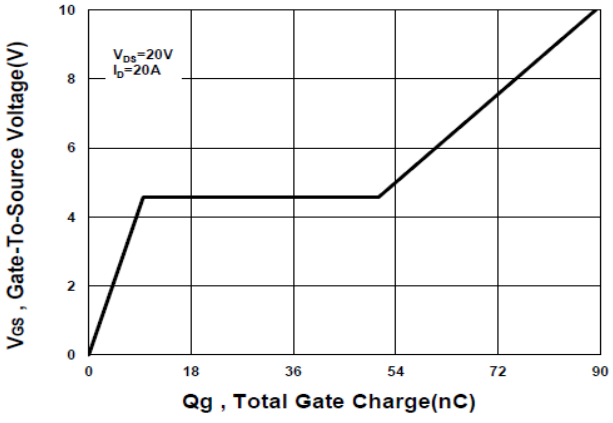
On-Resistance VS Temperature



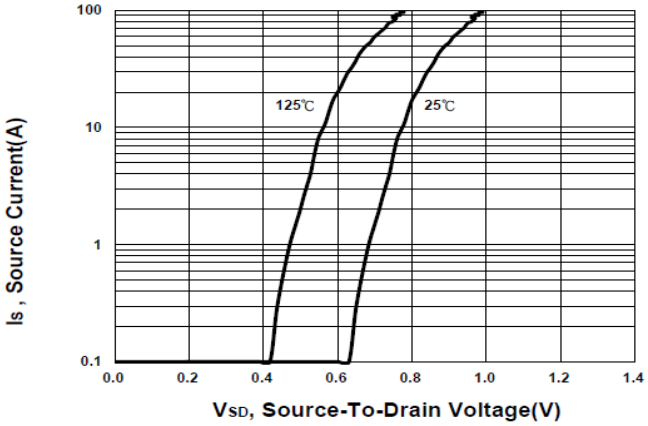
Capacitance Characteristic



Gate charge Characteristics



Source-Drain Diode Forward Voltage



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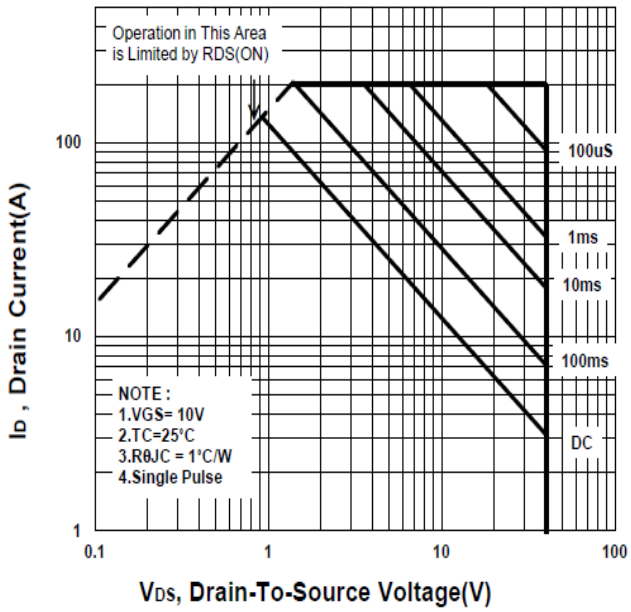
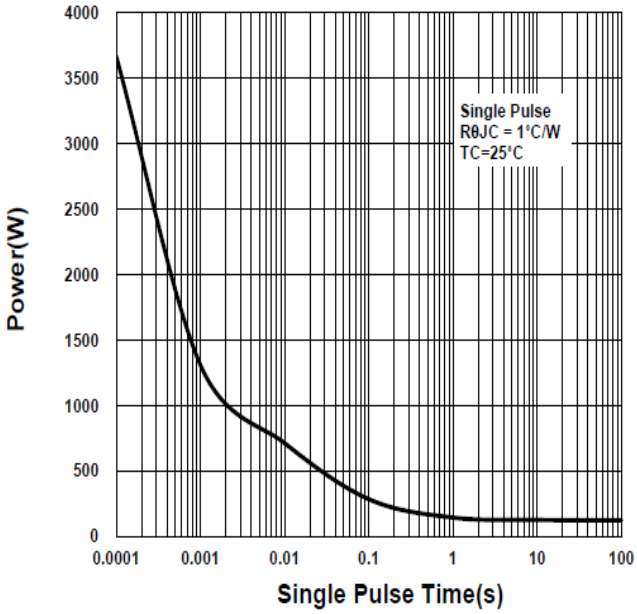
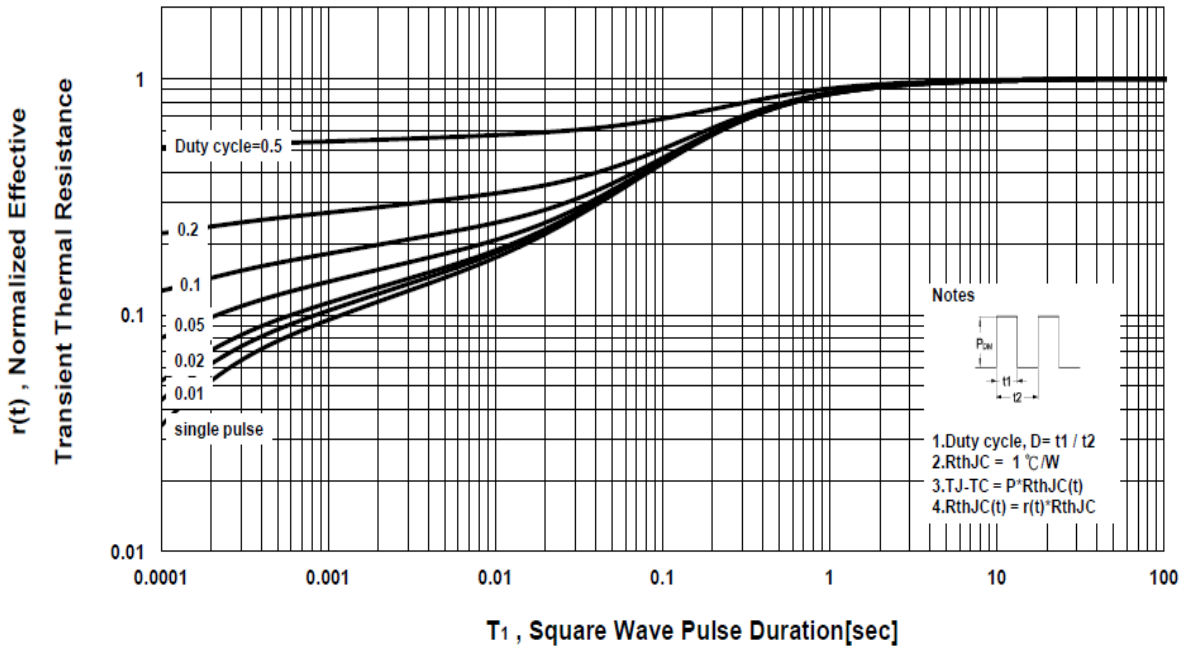
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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Package Dimension

TO-220 (3-Lead) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.652	10.16	11.5	H	2.04	2.54	3.04
B	2.54	2.79	3.048	I	1.15	1.52	1.778
C	17.3		22.86	J	3.556	4.57	4.826
D	26.924	29.03	31.242	K	0.508	1.3	1.45
E	14.224	15.45	16.510	L	1.89	2.69	3.09
F	8.382	9.20	9.40	M	0.34	0.5	0.6
G	0.381	0.81	1.016	N